Transactions of the Royal Entomological Society of London

Royal Entomological Society of London

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THE
TRANSACTIONS
OF THE
ENTOMOLOGICAL SOCIETY
OF
LONDON.

VOL. I.

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1836.

Observe.—*The Entomological Society does not hold itself responsible for any of the facts or opinions stated in the Memoirs published in this Work.*

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INTRODUCTION.

THE advantages attending the division of labour reach their maximum when not only individuals devote themselves chiefly to one object, but associate together for the purpose of promoting and extending it. Thus the division of science into its several branches, and the formation of separate societies for the particular cultivation of each respectively, has been eminently productive of benefit to all, though, perhaps, the system might have worked better had the whole arranged themselves under a supreme head, and become rather the affiliated members of one parent society, than have erected themselves into independent bodies. Be that, however, as it may, the advance of any science towards perfection must depend, not only on the number and talents of its cultivators, but also, in no trifling degree, on their acting in concert.

To a thorough conviction of this truth the Entomological Society of London owes its existence. Many of our most able and active cultivators of Entomology were desirous of establishing a more familiar intercourse between their fellow-labourers than had hitherto subsisted in this country, in the hope that by facilitating the mutual communication of facts, and the temperate discussion of disputed points, whether theoretical or practical, the progress of Entomology as a Science would be accelerated, and its utility materially promoted. No mode appeared so likely to answer this end as the formation of a Society for the purpose of holding periodical meetings, at which, memoirs on entomological subjects might be received and read; experiments for the destruction of noxious insects, and improvements in the domestication of those useful to man suggested; oral communications made, and new objects exhibited; and of forming a collection of insects, and a library of reference for the use of the Members. How far they have succeeded in their object will be best seen by the List of the Society, in which are included the names of many of the most distinguished naturalists of the present day, with that of the venerable Father of British Entomology at their head.

This is not the place to discuss the merits of the several communications now laid before the world, but we may be allowed to say, that a volume which can boast of so much original and interesting matter as, we fearlessly assert, will be found in the present, could hardly require any reasons to be assigned in vindication of its appearance, had not one of the most distinguished of our Members, after bearing honourable testimony to the utility of the Society, and 'the radical healthiness of its constitution,' expressed, both in his recently published 'Preliminary Discourse' and elsewhere, his dissent from the policy of publishing Transactions 'at our own charges' at all, considering that a Council 'so unwise as to plunge the Society into that expense' must 'either involve it in debt, or render it necessary to increase the subscription.' That the dignity of a scientific body is best consulted by publishing its memoirs in a separate volume devoted solely to the Transactions of the Society, and bearing its name, can hardly be questioned; and a Society which does not consult its own dignity must not look to have it very highly appreciated by the world. We mean no disrespect to any of the scientific journals of the present day; they are all more or less useful, and some of them eminently so, and excellent papers not unfrequently find their way into their pages; but so also do, occasionally, communications of a very different character. But it may be asked, can sterling merit be degraded by association with baser matter? Certainly not: the world, however, is apt to lay no small stress on associations; in short, the *noscitur à socio* is applicable to memoirs as well as to men, and if either desire to get into good society they must take care to avoid whatever is less highly valued in the more refined circles, whether of fashion, literature, or science.

Our friend's chief objection, however, to the publication of Transactions 'at our own charges' is that the Society cannot afford the expense, an objection which we confidently trust the Treasurer's statement of its affairs at the ensuing anniversary will satisfactorily answer; in the mean time we may add, that the success of the Transactions must depend on their popularity, and that again on their merit, and this last on the exertions of our Members, of which we have now the gratification of laying, as we think, a fair specimen before the world. Let us hope, therefore, that our friend will soon see cause to change his opinion and dismiss his fears, and as the best ground for doing so, that he will lend his aid towards ensuring the popularity of the Transactions of the Entomological Society by contributing largely to their contents.

Little more need be added; the volume is now before the public, and the contributors to its contents await its verdict without fear, because they are certain it will be guided by justice. Let it, however, be kept in mind, that the great and ultimate object of the founders of the Society is to promote the study of Entomology, both with a view to its practical utility in the common affairs of life, and the still more important influence which, when properly pursued, it is calculated to exert over the moral and religious feelings of its cultivators. Even within the short period that has elapsed since its formation, an application has been received on behalf of the sugar-planters of the island of Grenada, calling on the Society to take into consideration the ravages which the Cane-fly has of late years committed in that colony, and to endeavour to suggest some means of annihilating, or at least of mitigating the evils of that destructive insect. A Committee was appointed accordingly, who, having given the subject their most deliberate attention, delivered in a report, which is already on its way to the colony; and we have good reason to hope that even in this early instance the Entomological

Society will prove not to have been founded in vain. As to the influence of Entomology, when rationally pursued, over the mind and heart, none but 'the fool' who has said what 'none but a fool could have said,' can deny its power. If the artificial spider in which 'a thousand movements scarce one purpose gain,' excite our admiration at the talent that could devise, and the delicate hand that could execute the mechanism by which it describes its few and circumscribed motions, what should we think of that Artificer who, in the ten millionth part of its bulk, can establish organs of motion and vitality incalculably more perfect, incalculably more delicate? The mere collector, who uses his eyes to any tolerable purpose, can hardly miss the inference; but the scientific entomologist, who studies internal structure no less than external form, must be dead indeed to feeling if these wonders of the little world do not warm his heart to the full glow of adoration, and lead him to exclaim, in words like those applied by the poet to inconceivably mightier masses indeed, but not, therefore, mightier evidences of infinite wisdom and power,

> 'These are thy glorious works, Parent of good!
> Almighty! . . . .'

POSTSCRIPT.

It was not till some time after the foregoing Introduction was written, that the ninth Number of the Entomological Magazine came into our hands. We trust our readers will believe, from their general tenor, that no unkindly spirit dictated one line of the preceding pages; and we preface our further observations, unwillingly extorted by the work just alluded to, by the declaration, that no such feelings actuate us even now. We do feel, however, that we should be liable to the imputation of an abandonment of our duty, if we were to suffer some remarks and unfounded assertions contained in the number of the Entomological Magazine for October 1834, to pass unnoticed.

We shall make no comment on the sweeping observation at page 332, that all our entomologists, with only four exceptions, are fools, but content ourselves with thanking the editors, in the name of the rest, for the compliment. The assertion, however, in the next paragraph, that the Society is 'going down,' requires severer animadversion. This, it seems, is made on the circumstance that the meeting in September was attended by only twelve Members, and it is repeated at page 434, in the following paragraph: 'The attendance of 'members at these sittings has greatly decreased: at the 'July sitting about twenty members were present; at the 'August sitting, about fifteen; at the September sitting, 'about twelve.' Now, whatever the editors of this journal may please to insinuate, these attendances, considering the time of year, cannot be called bad; and as to their having 'greatly decreased' since the opening, it would have been very extraordinary if they had not, when a large proportion of the Members had left London, as always happens in the summer months. But look at the meetings of other societies at the same period,—the Zoological, for instance,—the number of members of that body who attended the scientific meetings in September did not amount on either occasion to twelve, although the proportion of members in the two societies is nearly as twenty-five to one. Is the Zoological Society also 'going down'?

We have already stated that the Council considered it essential to the credit of the Society that it should publish its own Transactions, and have given the reasons for their coming to that resolution. If any doubt could have been entertained of their wisdom in so doing, as far as the character of the Transactions might be affected by *association*, it is effectually removed by the conduct of the editors of the Entomological Magazine themselves, in having admitted that farrago of nonsense which, under the title of *Colloquia Entomologica*, stands at the head of their present number. So miserable an attempt at wit, and so ridiculous a parade of learning throws even Isla's *Domine* himself into the back-ground*. Why do they not practise the motto they have adopted,—*γνωθι σεαυτον*?

The following passage occurs at p. 333 of the *Colloquia*!

'ENT.—I am firmly persuaded, from what I see of the 'working members of its Council, that the Entomological 'Society will retard, not advance, entomology.'

Very civil! However, *spectemur agendo*!

As to the hope (p. 332) that 'the Entomological Society 'would have been the means of uniting entomologists into 'one body, and called forth kindlier feelings among us', we are not conscious of its having failed in that desirable object, nor do we know of any unkindly feelings connected with the Society, except those too palpably entertained by the conductors of the Entomological Magazine.

And why do they entertain them? We leave them to answer that question as they may, and shall merely state the fact, *that their wish to publish the Memoirs read before the Entomological Society, in their own journal, was not acceded to by the Council.*

We have now ended our unpleasant task, and shall not henceforth think it necessary to bestow any further notice on the Entomological Magazine,—whether it flatter or abuse, praise or condemn us.

* 'Lord! Lord! it was a very Gabilon! (Babylon). More than one full 'hour were we at it, hand to hand; and to every word I said, he produced, 'directly, such heaps of proofs and quotations, *all in Latin*, that it seemed for 'all the world as if he carried them in the breast-pocket of his large cloak.' —*History of Friar Gerund de Campazas*, vol. i. p. 172: London, 1772.

PROSPECTUS

OF

PRIZE ESSAYS

ON THE

SUBJECT OF NOXIOUS INSECTS AND REMEDIES FOR THEIR DESTRUCTION.

IT being one of the principal objects of the ENTOMOLOGICAL SOCIETY OF LONDON to render their labours practically useful, the Council have resolved to appropriate the annual sum of Five Guineas, or a Gold Medal of the like value, to the Writer of the best Essay (to be drawn up from personal observation) upon the natural history, œconomy, and proceedings of such species of insects as are obnoxious to agricultural productions, to be illustrated by figures of the insects in their different states; together with the result of actual experiments made for the prevention of their attacks or the destruction of the insects themselves.

The subject of the Essays for the year 1834 to be the TURNIP-FLY*.

The Essays must be forwarded to the SECRETARY, (at No. 17, Old Bond Street,) with fictitious signatures, on or before the Fourth Monday in January 1835, when they will be referred to a Committee to decide upon their respective merits, after which, with the permission of the Writers, both the Prize Essay and any others of value will be published.

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* "This part of our inquiry" (as to the transformations and early proceedings of the Turnip-fly) "is by far the most important; and, important as it is, cannot, in the present state of information, be fully answered."—*Report of the Committee of the Doncaster Agricultural Association on the Turnip-fly*, 1834, p. 23.

The Essays must be respectively accompanied by a sealed letter, indorsed with the fictitious signature adopted by each Author, and inclosing the real name of the Writer.

General Meeting,
2nd of June, 1834.

BY-LAWS.

Chap. I. *Object.*

THE Entomological Society of London is instituted for the improvement and diffusion of Entomological Science.

Chap. II. *Constitution.*

The Society consists of British and Foreign Ordinary Members, the number of whom shall be unlimited; and of Foreign Honorary Members, whose number shall not exceed ten.

Chap. III. *Management.*

The affairs of the Society shall be conducted by a Council, consisting of thirteen Members, to be chosen annually, four of whom shall not be re-eligible for the following year.

Chap. IV. *Officers.*

The Officers of the Society shall consist of a President; three Vice-Presidents; a Treasurer, who may be a Vice-President; a Secretary; and a Curator.

Chap. V. *Annual Election of Officers.*

The Officers shall be elected annually out of the Council. The President and two of the Vice-Presidents shall, however, not be eligible for re-election more than two years successively.

Chap. VI. *Duties of the Officers.*

The business of the President shall be to preside at all the Meetings of the Society and Council, and regulate all the discussions therein, and to execute, or see to the execution of the By-Laws and orders of the Society.

CHAP. VII. *Vice-Presidents.*

1. It shall be the duty of a Vice-President, in case of the absence of the President, to fill his place, or of a Member of the Council then present in the absence of all the Vice-Presidents, who shall for the time being have all the authority, privilege, and power of President.

2. If no Member of the Council shall be present at any Ordinary Meeting, the Members present shall nominate and appoint to be Chairman such Member as they shall deem fit.

CHAP. VIII. *Treasurer.*

1. It shall be the duty of the Treasurer to receive for the use of the Society all sums of money payable to the Society, and to disburse all sums payable by the Society out of the funds in his hands. He shall moreover furnish the Society with a true and particular account of all such receipts and disbursements twenty-one days previous to each Anniversary.

2. No payment exceeding £5, excepting for rent or taxes, shall be made by the Treasurer without the consent of the Council.

3. The Treasurer shall keep a book of Cheque Receipts for admission fees and annual payments; each receipt shall be signed by himself, the date of payment and name of Member paying being written both on the receipt and on the part of the cheque which is left in the book.

4. The Treasurer shall demand all arrears of annual payment, after such payment shall have been due three months.

5. The accounts of the Treasurer shall be audited annually previously to the Anniversary Meeting by a Committee of three Members of Council, and three Members of the Society, to be elected by Ballot, of which Committee three shall be a quorum.

CHAP. IX. *Secretary.*

1. It shall be the duty of the Secretary to keep a list of all the Members of the Society, stating their address, place of residence, &c.

2. Minutes of the Proceedings of Monthly and Council Meetings shall be taken by him, or in his absence by any Member whom the Chairman may appoint for the occasion.

3. The Minutes shall be fairly copied by him into a Minute Book, and at the next Meeting read aloud for confirmation.

CHAP. X. *Curator.*

1. It shall be the duty of the Curator to take care of the Library and Cabinets of the Society*; to display, arrange, and class the insects, &c. A Catalogue of the Library shall be made, and a Catalogue of the insects contained in the Museum shall be kept by him, containing the names of the donors and the times and places of their capture, as far as practicable.

2. All Members of the Society shall have free access to the Cabinets at the time specified in the By-Laws for the purpose of examination and description, excepting that if a Member or Stranger present specimens of new insects to the Society with manuscript names attached, specifying his intention of publishing the same, then no individual, whether Member or Stranger, shall during the space of twelve months publish any description or figure of such specimen.

3. No Stranger shall be allowed to see the Library or Cabinets unless in company with a Member, but a note addressed to the Curator, Secretary, or Member in attendance, shall be deemed a sufficient introduction, the Curator, Secretary, or Member in attendance then acting as the introducing Member.

4. No Stranger shall be permitted to take away or to describe any insect, or to make a drawing of the same, except by special permission of the Council previously obtained.

5. A Book for Synonyms shall be kept by the Curator, and any Member making observations therein must sign his name to them.

CHAP. XI. *Library Regulations.*

1. A Catalogue of the Library and MSS. shall be kept by the Curator, with the names of the Donors.

2. No Member shall be allowed to borrow from the Library more than two volumes at one time, or keep in his possession the same longer than one week, without leave of the Curator.

3. If the Books are torn, injured, lost, or not forthcoming when demanded by the Curator, full compensation shall be made for the same by the borrower.

---

* The Curator is in attendance at the Rooms of the Society every Tuesday between the hours of Eleven and Four, for the purpose of showing the Collections, &c. to Members of the Society.

CHAP. XII. *Election and Admission of Members.*

1. Every Candidate for admission as a Member of the Society shall be proposed by three or more Members, who must sign a Certificate in recommendation of him.

2. One of the three must have personal knowledge of the Candidate.

3. The Certificate shall specify the name, rank, profession, qualifications, and usual place of residence of the Candidate.

4. The Certificate having been read at one of the Ordinary Meetings, shall be suspended in the Room, and the person therein recommended shall be balloted for at the second Ordinary Meeting after such reading.

CHAP. XIII. *The Election of Members.*

The method of voting for the election of Members is by Ballot, and two thirds of the Members balloting shall elect.

CHAP. XIV. *Admission Fee.*

1. The Admission Fee shall be £2 2*s*., the Annual Contribution £1 1*s*.; and the composition in lieu of the Annual Contribution £10 10*s*.

2. The Annual Contribution shall become due on the first day of January in every year in advance; but any Member elected after the 30th of September will not be called upon for his subscription for the remaining portion of that year.

CHAP. XV. *Withdrawing and Removal of Members.*

1. Every Member having paid all fees due to the Society shall be at liberty to withdraw therefrom upon giving notice in writing to the Secretary.

2. Whenever written notice of a Motion to be submitted to a General Meeting for removing any Member from the Society, signed by the Chairman for the time being of the Council, on the part of the Council, or by any five or more Members, shall have been delivered to the Secretary, such notice shall be read from the Chair at the four successive Ordinary General Meetings next following the delivery thereof; and within fourteen days after the last of such Meetings, a Special General Meeting shall be called for taking such Motion into consideration, and deciding it by method of Ballot; whereat if eleven or more Members shall ballot, and a majority of

the Members balloting shall vote that such Member be removed, he shall be removed from the Society.

Chap. XVI. *Privileges of Members.*

1. The Members have the right to be present, to state their opinion and to vote at all Meetings, to propose Candidates for admission into the Society, either as Ordinary or Honorary Members, to introduce Visitors at General Meetings of the Society, and to introduce scientific foreigners to the Library and Museum, to purchase the Transactions of the Society at reduced prices, and to have personal access to the Library and Museum.

2. No Member to introduce more than one Visitor.

3. All the Members are eligible to any office in the Society.

4. No Member shall be entitled to vote on any occasion until he shall have paid his subscription for the then current year.

Chap. XVII. *Foreign Members.*

1. Every Foreigner who has distinguished himself as an Entomologist, or who has shown himself able and willing to promote the ends for which the Society is founded, may be elected a Foreign Member; his Annual Contribution shall be £1 1*s*., and he shall be entitled to the same privileges as other Members.

2. Foreign Members shall not be required to sign the Obligation until present at a General Meeting of the Society, and when so present shall be admitted as other Members.

3. Foreign Members shall be exempt from the payment of any Admission Fee.

Chap. XVIII. *Honorary Members.*

1. Every person proposed as an Honorary Member shall be recommended by the Council, and be balloted for, and elected, and be liable to be removed in the like form and manner, and be subject to the same rules and restrictions as an Ordinary Member.

2. Honorary Members shall be exempted from the payment of Fees and Contributions; they shall have the privilege of attending the Meetings, and have access to the Library and Cabinets, but they shall not be entitled to vote at the Meetings of the Society.

3. No resident in Great Britain can be an Honorary Member, except the Honorary President, the Rev. William Kirby, A.M. F.R.S. &c.*

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* And William Spence, Esq., F.R.S., who was elected as an Honorary English Member at the same Meeting at which the By-Laws were adopted.

CHAP. XIX. *Meetings of the Society.*

1. The Ordinary General Meetings of the Society shall be held on the first Monday in every month in the year, beginning at eight o'clock precisely in the evening, or at such other time as the Council shall direct.

2. At the Ordinary Meetings the order of business shall be as follows.

3. The names of the Visitors allowed to be present at the Meeting shall be read aloud by the Chairman.

4. The Minutes of the last Meeting shall be read aloud by the Secretary, and proposed for confirmation by the Meeting, and signed by the Chairman.

5. The Presents made to the Society since their last Meeting shall be announced and exhibited.

6. Certificates in favour of Candidates for admission into the Society shall be read or submitted to ballot.

7. Members shall sign their names in the Obligation Book, and be admitted.

8. The President shall have a discretionary power as to the Papers to be read at the Meetings of the Society; and the Secretary, assisted by the President and any Member or Members of the Council, shall determine as to the priority in which such papers shall be read, and propriety of omitting any portion of the same.

9. All Memoirs which shall be read at any General Meeting of the Society shall become the property of the Society, unless otherwise stipulated for previous to the perusal thereof*.

10. Entomological communications shall be announced and read either by the Author or the Secretary. When the other business has been completed, the persons present shall be invited by the Chairman to make their observations on the communications which have been read, and on the specimens or drawings which have been exhibited at the Meeting.

11. No Motion relating to the government of the Society, its By-Laws, the management of its concerns, or the election, appointment or removal of its Officers, shall be made at any Ordinary Meeting.

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* This Clause was adopted at the General Meeting of the 5th of May 1834.

CHAP. XX. *Special General Meeting.*

Upon the requisition of any nine or more Members, presented to the President and Council, a Special General Meeting of the Society shall be convened, and any proposition to be submitted to such Meeting shall be stated at length in the Notice to Members.

CHAP. XXI. *Annual General Meeting.*

1. The Annual General Meeting of the Members shall be held in the Meeting-room on the fourth Monday in January of every year.

2. The objects of the Meeting shall be to choose the Council and Officers for the then ensuing year; and to receive from the Council, and hear read, their Annual Report on the general concerns of the Society.

3.* The Council for the time being shall annually cause to be prepared two written Lists, one of which (No. 1. in the Schedule hereto) shall contain the names of four Members, whom they shall recommend to be removed from, and of other four Members to be elected into the Council; and the other List (No. 2.) shall contain the names of such Members as they shall recommend to fill the offices of President, Treasurer, Secretary, and Curator for the year ensuing, which Lists shall be read at the Monthly Meeting in January in every year, and then fixed up in the Meeting-room for the space of fourteen days at the least. And if any six or more Members shall desire to substitute the name or names of any other person or persons, not exceeding four in number, than such as shall be contained in the said Lists, to be removed from or elected into the Council, or to fill the respective offices of President, Treasurer, Secretary, or Curator, such six or more Members shall leave Notice in writing, signed with their names, at the Rooms of the Society, of the name or names they propose to substitute, within the said space of fourteen days. And after the expiration of such fourteen days, in case no notice shall have been given as aforesaid, the said Balloting Lists shall be printed; but in case of any such Notice or Notices left as aforesaid, then the name or names proposed to be substituted shall be added to the Lists respectively proposed by the Council in different coloured ink, according to the forms Nos. 3. and 4. in the Schedule hereto. And such Lists shall be transmitted to every Member whose known residence shall be in London, or within the limits of the Threepenny Post, at least seven days before the Annual General Meeting shall take place.

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* This and the four following Clauses were adopted at the General Meeting of the 1st of September 1834.

4. On the day of voting, each Member present shall put his Balloting Lists into the respective Glasses to be provided for such occasion; before doing which, however, in case any name or names shall have been added to the Lists proposed by the Council, he shall strike out the name or names of those persons recommended for whom he does not vote. And if more names shall be suffered to remain in any List than the number of persons to be elected or removed, such Lists shall be rejected. And in case the names suffered to remain shall be less than the number of vacancies to be supplied, those names only which shall remain in the List shall stand as voted for.

5. The President shall appoint two or more Scrutineers from the Members present, not being Members of the Council, to superintend the Ballots, and report the results to the Meeting.

6. The Ballot for the Council shall remain open for one half-hour at the least, and the Ballot for the Officers for one half-hour at the least, after the result of the Ballot for the Council shall have been declared.

7. If from any cause an election shall not take place of persons to fill the Council, or any of the offices aforesaid, then the Election of the Council and Officers, or the Election of Officers, as the case may be, shall be adjourned until the next convenient day, of which notice shall be given, in like manner as is directed for the Annual General Meeting.

8. No Ballot, either for the election of Members or any other business, shall be taken unless nine Members be present.

CHAP. XXII. *Transactions.*

1. The Transactions shall consist of Papers communicated to the Meetings of the Society.

2. The Transactions shall be published from time to time, and at such prices as the Council shall direct for each Part or Volume; but the price for one copy of each Part or Volume to each Member who shall have paid his Annual Contribution for the year in which such Part or Volume shall be published, shall not exceed three fourths of the price charged to the public.

3.* Foreign Members of the Society who shall have paid the Annual Subscription for the year, shall be entitled to receive the Transactions of the Society published during the year without any further payment.

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* This Clause was adopted at the General Meeting of the 5th of May 1834.

4. The superintendence of the Publications shall be by a Committee, which shall consist of nine Members, and of the President, Vice-Presidents, Treasurer, and Secretary.

5. The Committee of Publication shall consider every Paper which shall be communicated to the General Meeting of the Society, and shall report to the Council thereon; but no Paper shall be reported on at any Meeting of the Committee unless there shall be five or more Members present*.

CHAP. XXIII.† *Alteration of the By-Laws.*

Any of the By-Laws of the Society may at any time be repealed, or altered and amended, or others adopted in lieu thereof, at any Meeting of the Society, to be specially summoned in pursuance of Notice to be given to the President and Council, to be signed by nine Members at least, such Notice to specify the intended repeal or alteration, and to be read at three General Meetings of the Society previous to such Special Meeting.

THE SCHEDULES REFERRED TO IN CHAPTER XXI. OF THE PRECEDING BY-LAWS.

No. 1.

Form of the List for the Council.

List of Four Members of the present Council recommended by the Council to be removed at the Election on the day of January 18 .

A B E F
C D G H

Four Members recommended to be elected into the Council.

I K N O
L M P Q

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* The following Resolution was adopted by the Council at the Meeting of the 4th of August 1834:—

That Authors of Memoirs to be published in the Transactions of the Society shall be allowed an unlimited number of Copies of their Communications, the entire expense whereof shall, however, be borne by themselves.

† This Clause was adopted at the General Meeting of the 5th of May 1834.

No. 2.

Form of the List for the Officers.

List of Persons recommended by the Council to be appointed to the offices of President, Treasurer, Secretary, and Curator of the Society, at the Election on the day of January 18 .

President . .	B A
Treasurer . .	D C
Secretary . .	F G
Curator . .	H G

No. 3.

Form of the List for the Council when a Notice or Notices shall have been given according to Chapter XXI. Clause 3. of the By-Laws.

List of Four Members of the present Council recommended to be removed.

By the Council.

A B	E F
C D	G H

By Notice signed by and .

I K	N O
L M	P Q

By Notice signed by and .

R S	V W
T U	X Y

List of Four Members recommended to be elected into the Council in their places.

By the Council.

B A	F E
D C	H G

By Notice signed by and .

K I	O N
M L	Q P

By Notice signed by and .

S R	W V
U T	Y X

Note.—If more than four names are suffered to remain, the Vote will be rejected.

No. 4.

Form of the List for the Officers when a Notice or Notices shall have been given according to Chapter XXI. Clause 3. of the By-Laws.

List of Persons to be appointed to the offices of President, Treasurer, Secretary, and Curator of the Society at the Election on the day of January 18 .

As recommended by the Council.

President . .	A B
Treasurer . .	C D
Secretary . .	E F
Curator . .	G H

As recommended by Notice signed by and .

President . .	I K
Treasurer . .	L M
Secretary . .	N O
Curator . .	P Q

As recommended by Notice signed by and .

President . .	R S
Treasurer . .	T U
Secretary . .	V W
Curator . .	X Y

Note.—If more than one name shall be suffered to remain for each Officer, the Vote will be rejected.

LIST OF MEMBERS.

(*To the* 6*th of October* 1834, *inclusive.*)

Those Persons to whose Names an Asterisk is prefixed are original Members.

Honorary President.

* The Reverend William Kirby, M.A., F.R.S. L.S., &c. &c.

Honorary English Member.

* William Spence, Esq., F.R.S. L.S., &c.

Honorary Foreign Members.

Audouin, M. Victor, Cheval. Leg. Honour, Professor at the Jardin des Plantes, President of the Entomological Society of Paris, &c. Paris.

Gravenhorst, Professor J. L. C., Phil. Doct., &c. Breslaw, Silesia.

Gyllenhall, Major Leonard, Cheval. of the Royal Order of Wasa, Member of the Acad. Sciences of Stockholm and Upsal, &c. Skara, Sweden.

Haan (De), W., Phil. Doct., Member of the Societies of Natural History of Regensbourg, Calvados, Paris, &c., Conservator of the Museum at Leyden.

Hammerschmidt, ——, Doctor of Laws, Member of various Societies of Natural History. Vienna.

KLUG, Dr. FREDERICK, Hon. Memb. Ent. Soc. France, Director of the Museum of Natural History, &c. Berlin.

LEFEBVRE, M. ALEXANDRE, Corresponding Member of the Museum d'Histoire Naturelle de Paris, of the Imperial Society of Naturalists of Moscow, Secretary of the Entomological Society of France, &c. Paris.

PASSERINI, Signor CARLO, Member of the Entomological Society of France, Director of the Museum of Natural History, &c. Florence.

SCHÖNHERR, C. J., Councillor of Commerce, Cheval. of the Order of the Polar Star, Member of the Academies of Natural Sciences of Stockholm, Pisa, Moscow, Berlin, Leipzic, &c. Skara, Sweden.

WEIDEMANN, Dr. CHR. R. W., Prof. Zool. Keil.

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*Bass, Isaac Gray, Esq., Brighton.

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*Blundell, Thomas, M.D., Newgate-street, London.

*Bowerbank, J. S., Esq., 19, Cutchell-place, New North-road, London.

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TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

I. *Observations on a Mode practised in Italy of excluding the Common House-fly from Apartments. By* WILLIAM SPENCE, *Esq., F.R.S., &c., Honorary Member of the Entomological Society.*

[Read April 7, 1834.]

THE habits, manners and instincts of insects, their anatomy and physiology, and their useful or noxious properties, will doubtless attract a large share of the attention of the members of the Entomological Society, without inducing them to underrate, as has sometimes been done, the importance of the systematic department of the science, on which all accurate information respecting its objects must be founded. Knowledge as to the structure, habits and œconomy of insects ought, indeed, to be the grand and ultimate aim of entomology; but this knowledge can be neither acquired nor diffused without systematic classification, which is the dictionary that must enable us duly to read the great book of nature, and to which, therefore, so long as that dictionary still remains so incomplete, even the largest portion of the entomologist's labours may be justly given, while, at the same time, no fact, however trifling, relating to the habits and œconomy of the objects of his study is suffered to be lost, the two great branches of the science, system and the natural history of insects (taken in its largest sense), being made to go hand in hand, and mutually to support each other.

To one department of the natural history of insects, which has been hitherto much neglected, I should beg particularly to direct the attention of the Society,—I mean what may be called the *metaphysics* of entomology, or an investigation of the limits which bound their instincts on the one hand, and that small portion of mind and reason which few will deny them, on the other. And here what is chiefly to be desired are *facts*, the want of a sufficient collection of which has hitherto been the chief cause of the vague and inconclusive way in which this highly interesting subject has been often treated; as by Dr. Darwin, for example, whose theory of the supposed instinctive actions of animals being really referrible to their reason solely, is mainly built on statements as to changes of the instinct of a species having taken place, when in reality species altogether distinct were confounded together.

These facts can be scarcely too numerous or minute if accurately stated; and to show that they may be drawn from sources not hitherto often considered within the range of the objects of a scientific Society, I shall here beg to lay before you a few observations on a very humble and undignified topic,—a mode practised in Italy of excluding the common house-fly from their summer apartments,—which, though it may perhaps at first view seem a subject more appropriate to the pages of a magazine of domestic œconomy, will not, I trust, when its close connexion with the interesting questions just alluded to, and more especially the curious and unexpected light which it throws on a passage of the father of history, are considered, be deemed wholly unworthy to occupy a share of the attention of the Society.

In this country the common house-flies (*Musca domestica*), towards the close of the summer and the commencement of the autumnal months often become a great nuisance, both from their numbers and the pertinacious curiosity with which every individual of the race seems resolved, for its own satisfaction, to taste, see and touch every object around it, even perching upon and exploring the "human face divine," as if in mockery of our boasted supremacy, and to humble us by the conviction that the equanimity of the philosopher as well as the comfort of the suffering invalid is often at the mercy of a fly. But it is to more southern and hotter climes that we must direct our view if we would form a correct idea of the real pest which these little restless intruders become in the warm months, when they literally almost fill the apartments. Every traveller in the South of Europe during the hot months will confirm the assertion of Arthur Young, that "they are the first torments in Spain, Italy, and the olive districts of France. It is not that they bite, sting, or hurt, but they buzz, teaze and worry: your mouth, eyes, ears and nose are full of them; they swarm on every eatable, and if they are not incessantly driven away by a person who has nothing else to do, to eat a meal is impossible*." And it is evident from various incidental notices in the journals of travellers, that they are to the full as great a plague in the hot climates of other portions of the globe. To omit other instances which it would be tedious to cite, Mr. Stewart, in his recent valuable work on North America, speaks on three several occasions of the annoyance which he suffered from flies, which he seems to have found a worse torment than the mosquitoes†.

Such being the serious and extensive drawback on the comfort of existence caused by the house-fly in the hot months over a large portion of the globe, it will be believed that my curiosity was strongly excited on being told, when at Florence last spring, by a gentleman who has long resided in the neighbourhood of that city, that for two or three years past he had so entirely succeeded in excluding these intruders from his apartments, though allowing the windows to be wide open for the admission of air, that while the sitting- and dining-rooms of his neighbours swarmed with them, in his a strict search would be necessary to detect even two or three; his plan thus superseding all the former modes of removing this plague by poisoning the flies by sweetened infusions of green tea, quassia, &c., which were liable to this great and fatal objection, that unless the windows were closed, or covered with gauze (which necessarily excludes the free entrance of the air), fresh hosts of tormentors were constantly entering to replace those destroyed.

If my curiosity was excited by this statement, my surprise was not lessened by being told, in explanation of the apparent impossibility of thus excluding flies from a room with unclosed windows, that, in point of fact, the openings of the windows were covered with a net, but with a net made of white or light coloured thread, and with meshes an inch or more in diameter; so that there was actually no physical obstacle whatever to the entrance of the flies, every separate mesh being not merely large enough to admit one fly, but several, even with expanded wings, to pass through at the same moment, and that, consequently, both as to the free admission of air, and of the flies if they had chosen, there was practically no greater impediment than if the windows were entirely open, the flies being excluded simply from some inexplicable dread of venturing across this thread-work.

My friend did not profess to have discovered this plan of excluding flies: he first saw it adopted in the monastery of Camaldoli (or La

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* Travels in France, vol. i. p. 298.

† Vol. i. pp. 29, 195, 405.

Verna, I forget which,) near Florence, the monks of which assured him of its efficacy, and afterwards by an artist at Rome, who warmly expatiated on the important advantage which it conferred on him of being able to work in his studio with open windows, and yet free from the personal annoyance of flies, and the equally great one of their settling on his newly painted pictures.

Furnished with these hints, my friend, whose practical good sense and habit of observation turns every new fact to profit, lost no time in having thread-nets made, and adapting them to his windows (which, as in Italy generally, are what we call French windows, opening interiorly, so as when thrown back to leave the whole space free), with the completely satisfactory result already mentioned, and this with the least possible expense, trouble, or inconvenience, the cost of a thread-net being a mere trifle, and all that is necessary being to fix it as soon as the flies begin to be troublesome, across the outside opening of the window, where it neither intercepts the air nor view, and where it is suffered to remain until the approach of winter, and the consequent disappearance of the flies. It is not even necessary to be at the expense of an actual net, for if small nails be fixed all round the window-frame at the distance of about an inch from each other, and threads be then stretched across both vertically and horizontally, the apparatus will be equally effectual.

Here, however, it is necessary to state a remarkable fact which my friend discovered in the course of his observations, namely, that for this plan of excluding flies to succeed, it is essential that the light enter the room on *one side* of it only, for if there be a *thorough* light either from an opposite or side window, the flies pass through the net without scruple. This circumstance, though not at all materially lessening the value of the practice, as rooms are usually (or may be) lighted from one side only, must yet be borne in mind in investigating the subject.

Before we proceed to speculate on any extraordinary fact, it is essential to be certain of its accuracy, and not only did the result of numerous minute inquiries which I made of my informant, who, though no entomologist, is a very careful observer, convince me of the correctness of his statements, but they have been since amply confirmed in all points by other intelligent friends resident in Italy, who inform me that they have repeatedly seen this mode of excluding flies adopted with perfect success. One of them added that it is not even necessary to have a net, or threads arranged both vertically and horizontally so as to resemble one, but that if threads be stretched in a horizontal direction only, across the openings of the windows, at the distance of about an inch from each other, this is sufficient to keep out the flies. This gentleman also confirmed my previous impression, from all the inquiries I had made, that this mode of excluding flies has not been long practised in Italy and is still little known there, while as far as I could learn it is entirely unknown in France.

Such being the facts connected with this subject, the next point to be considered, and that which will chiefly interest the entomologist, is as to the causes of so unexpected a result; in other words, What is it that gives to these thread-nets so terrific an aspect in the imagination of the house-fly, as to deter it as if spell-bound from ever venturing to penetrate through their meshes, though so much wider than its size demands? and to this query I confess that I have no satisfactory answer to offer.

The most plausible supposition stated has been, that the flies take the thread-nets for spiders' nets or webs, and as they are led by their instinct to avoid the latter, they equally avoid the former. Several objections, however, may be urged against this explanation. In the first place, judging from the numbers of flies which are constantly caught in spiders' nets and webs, it may be doubted whether they are endowed with any peculiar instinct leading them to avoid these snares. In the second place, supposing the existence of such an instinct, this feeling should lead the common house-fly chiefly to avoid the horizontal webs of the house-spider (*Aranea domestica*, Linn.), to which the thread-nets have no resemblance. And, thirdly, supposing its instinct to be equally directed against the concentric-circled nets of the garden-spider (*Epeira Diadema*) to which the thread-nets have a greater, though still but a remote similarity, it is unaccountable how the having a thorough light in the room should dispel the apprehension of the fly, since this very circumstance would make the thread-nets more closely to resemble these spiders' concentric nets, which are usually fixed in open places with a free admission of light on each side.

But in truth it is premature to speculate as to the motives of the actions of the flies until the facts have been with this view more carefully observed by professed entomologists, and it is chiefly in the hope that some of the members of the Entomological Society will direct their attention to the subject in the course of the ensuing autumn, that I have thrown together these hasty and imperfect notices. The points to which it is most important to advert would seem to be, the thickness and colour of the threads, whether those of a dark are as effectual as those of a light colour, and the result of substituting for them thick cord or worsted; the size of the meshes, and the ascertaining the extreme width at which they cease to have effect; how far mere horizontal threads are as effectual as a net-work of both vertical and horizontal ones, &c.: and by observations on these points and various others which will suggest themselves, and especially by carefully watching the motions of the flies on the outside of the windows, as to their approaching or avoiding the net, and their different conduct when a thorough light is admitted, there can be little doubt that some approach may be made to a solution of the question, whether their movements in this case are influenced by pure instinct or by reason and calculation, and thus some valuable additions be made to the metaphysics of entomology, that branch of the science which, as I began by observing, has been hitherto so much neglected, but is in itself so highly interesting.

Another point, too, to which it seems desirable to pay attention is as to the precise species of flies which have this dread of passing through a net. It seems probable, from the facts stated, that not merely the common house-fly (*Musca domestica*), which chiefly swarms in our apartments, but the other species of the same genus which in smaller number intermingle with them, as well as *Stomoxys calcitrans*, which from its attacks on our legs is often a greater pest, and, indeed, the dipterous tribes in general, are all equally deterred from traversing this imaginary boundary. But before this supposition can be fully adopted, more exact observations than have yet been made require to be instituted, and it would also be desirable to have similar experiments made as to the house-flies of America and other hot countries, in which it is probable that in the same way as our common sparrow (*Fringilla domestica*, Linn.) is replaced in Italy by another species (*F. cisalpina*, Temm.), which to an ordinary observer seems identical with ours, but is really distinct, the prevalent house-fly may be a species nearly allied to *Musca domestica*, which it replaces, but distinct from it.

I shall conclude my remarks with briefly adverting to the connexion, alluded to in the introductory paragraphs, which has been unexpectedly found to exist between this subject and a topic of classical criticism. On mentioning the facts above recorded, when I first learnt them at Florence, to my family circle, my eldest son observed that he recollected a passage in Herodotus in which a similar statement was made as to gnats, and fetching the volume, he pointed out the chapter in which the father of history distinctly says, that certain Egyptian fishermen defended themselves at night from the gnats by covering their beds with the nets which they had used in the day for fishing, and through which these insects, though they bit through linen or woollen, did not even attempt to bite. But as to enter fully into this matter would at present occupy too much of the Society's time, on which I have already trespassed longer than I originally meant, and as, besides, it will be best that he to whom this unexpected coincidence first occurred should himself explain the subject in detail, I shall leave it to him to lay before the Society the passage in question, and such comments as it may suggest, at a future meeting.

II. *Remarks on the Passage in Herodotus referred to in Mr.* SPENCE'S *Paper, read at the April Meeting. By* W. B. SPENCE, *Esq., M.E.S. France, For. Sec. Ent. Soc.*

[Read May 5, 1834.]

I BEG leave to lay before the Society a few remarks on the passage of Herodotus referred to in my father's late paper, which was brought to my recollection on hearing him mention that flies were kept out of houses at Florence by merely having a net stretched across the windows.

The passage in question occurs in the second book of Herodotus, in which, after having given a general description of the customs, manners, and religion of the Egyptians, he goes on to describe the natural history of the country, and forms the 95th chapter, which is as follows:

95. *Πρὸς δὲ τοὺς κώνωπας ἀφθόνους ἐόντας τάδε σφί ἐστι μεμηχανημένα. τοὺς μὲν τὰ ἄνω τῶν ἑλέων οἰκέοντας οἱ πύργοι ὠφελέουσι, ἐς οὓς ἀναϐαίνοντες κοιμέονται· οἱ γὰρ κώνωπες ὑπὸ τῶν ἀνέμων οὐκ οἷοί τέ εἰσι ὑψοῦ πέτεσθαι. τοῖσι δὲ περὶ τὰ ἕλεα οἰκέουσι τάδε ἀντὶ τῶν πύργων ἀλλὰ μεμηχάνηται. πᾶς ἀνὴρ αὐτέων ἀμφίϐληστρον ἔκτηται, τῷ τῆς μὲν ἡμέρης ἰχθῦς ἀγρεύει, τὴν δὲ νύκτα τάδε αὐτῷ χρᾶται ἐν τῇ ἀναπαύεται κοίτῃ· περὶ ταύτην ἵστησι τὸ ἀμφίϐληττρον, καὶ ἔπειτα ἐνδὺς, ὑπ' αὐτῷ καθεύδει. οἱ δὲ κώνωπες, ἢν μὲν ἐν ἱματίῳ ἐνελιξάμενος εὕδῃ ἢ σινδόνι, διὰ τούτων δάκνουσι· διὰ δὲ τοῦ δικτύου οὐδὲ πειρῶνται ἀρχήν.*

Of the above passage the following is a translation, which I have made as literal as possible; but that there may be no doubt of its general accuracy I have compared it with the various translations of Schweighæuser, Larcher, and Beloe, with which in substance it exactly agrees:

"But against the gnats, being in great numbers, these are the means they have invented: the towers are of service to those who inhabit the upper parts of the marshes, and ascending into them, they sleep there, for the gnats, on account of the winds, are not able to fly high. But those who live around the marshes have invented other means instead of towers. Every man of them possesses a casting-net, with which during the day he catches fishes, and at night he makes use of it in the bed where he reposes, round which he places the net, and then, having crept under it, he sleeps. But the gnats, if he sleeps wrapped up in a woollen or linen garment, bite through these, but through the net they do not even attempt to bite."

From this passage, then, it is clear that Herodotus affirms the same fact with regard to the Egyptian *Conopes* (which, both from what he says of their frequenting marshes and biting by night and the recieved interpretation of the word, there can be no doubt were one or more species of gnat, musquitoe, or *Culex*,) as has been observed of the house-fly, namely, that they will not pass through the meshes of a net although the space is sufficiently large to admit them. If Herodotus had mentioned merely a net, one might have supposed that he meant some very thin gauze or other net-like substance, such as the gnat-curtains are made of at the present day; but he says it was a casting-net (ἀμφίϐληστρον) used by fishermen, and must have had meshes much wider than sufficient to admit a gnat; nor, I think, can there be even a shadow of doubt on this head, when we consider that he adds that they bite through linen and woollen coverings, and yet do not even attempt to bite through the net; which circumstance seems to prove that he was struck with this as a curious fact, which he imparts to his readers in his usual concise manner. It will also be seen from the expression used, that the net was not merely laid on the bed as a covering, but sustained by some support, (as a pole or bedstead,) so as to form a kind of tent, into which form the casting-net from its shape could be easily arranged, and under which the fishermen then crept, and thus slept secure from their formidable assailants. This is also the meaning attributed to the passage in Schweighæuser, who says, "lecto circumponit rete, deinde subrepens sub illo dormit." Thus it would seem that the beds so covered agreed in all essential points with the Florentine rooms, of which the open windows had nets stretched across them, the gnats in the one case being asserted by Herodotus to be kept out under nearly the same circumstances as the flies are known to be excluded in the other.

But here an objection may arise: May not this coincidence be accidental? Can we be sure that if flies are excluded by nets, gnats will be so also? In short, can we warrant the conclusion that the assertion of Herodotus is correct? And, until the experiment has been fairly made, we cannot be certain that gnats will be excluded from beds as flies are from rooms. But at the same time, judging from analogy, and the great improbability that so unusual a mode of defence, and one so unlikely *à priori* to be effectual, should have been a mere fiction without a foundation of truth, there seem strong grounds for believing the fact to be as stated by Herodotus; and that though, as is well known to people who live in hot climates, gnats soon find their way through holes in gauze curtains, yet it is very probable that they may be afraid of venturing through a net, just as this last is sufficient to keep out flies, though we know that they will creep through the linen sides of a meat-safe. And thus the father of history may be found to be as correct in this passage as Geoffroy de St. Hilaire has shown him to be in the history of a bird (*Charadrius Egypticus* of Hasselquist) taking the gnats out of the mouth of the crocodile, which was deemed a mere fable until fully confirmed by the evidence of this naturalist when in Egypt. (Vide 'Déscription de l'Egypte,' *Histoire Naturelle*, tom. i. p. 198—205.)

If it shall be proved by experiment, as seems not unlikely, that a person in bed may protect himself against the attacks of gnats merely by stretching a wide-meshed net over the place where he lies, it may be regretted that this simple fact related by Herodotus as known to the Egyptian fishermen 2300 years ago, has been so long overlooked, and remained in reality quite unknown. Adopting this simple mode of protection, a traveller in marshy districts would have only to provide himself with a piece of netting three yards long and a yard wide, not taking up, when rolled, more than a few square inches of his trunk, and throwing this over a slight support of a few pieces of cane or whalebone equally portable, he would be secure from attack, though the net were but a few inches above his body, and the width of the meshes would not offer the slightest impediment to respiration and the free circulation of the air; whereas it is almost out of the question to use a piece of muslin or gauze in the same manner at a slight elevation above the body, on account of the suffocating heat that would ensue; and if, in order to obviate this, the traveller were to carry with him common gauze curtains, as now in use, sufficiently spacious to inclose the whole bed, the time and trouble required in arranging and applying them would often be such as even to deter him from making use of them, and to make him prefer taking his chance without any defence.

If there is thus cause for regret that this fact, which appears so important, should have been so long and so completely overlooked, it seems not less to be wondered at that the passage in Herodotus which announces it should have been so little noticed by commentators, not one of whom seems to have been struck with the singularity of his statements, which, whether correct or not, equally required observation. One would think that in reading this passage it must have seemed to them rather strange that a casting-net whose meshes must have been wide enough to admit several gnats at a time should yet be asserted by Herodotus to be a sufficient defence from them, though they bit through either linen or woollen; and one may be well surprised that whilst they have spent pages on passages far less curious, they should pass this over with a mere reference to Juvenal or Horace where these authors allude to the *conopeum*, or gnat-curtain.

The fact seems that all these commentators have been led astray by the word *conopeum*, confounding the casting-net of the Egyptian fishermen with the gnat-curtain of the Romans, which both from the definitions given of it, "linum tenuissimis maculis nectum," ("thread knitted together in very fine meshes,") and from the use as banners, to which Horace supposed it applied,

> "Interque signa (turpe!) militaria
> Sol aspicit conopeum," (*Epod.* lib. ix. ode 9.)

was evidently of a texture resembling our muslin or gauze. If, therefore, they had been duly struck by the passage, they ought either to have shown how it was that a casting-net could exclude gnats as effectually as gauze, or else, that in point of fact the texture of both was the same, the casting-net having, notwithstanding the apparent absurdity of the supposition, meshes so small as to prevent gnats from coming through them, or, on the other hand, the *conopeum* though applicable for a banner, having meshes as large as a casting-net. But nothing of this kind has been attempted in the way of explanation by Schweighæuser, Larcher, Baehr, or any of the commentators I have consulted, who all seem to regard the *conopeum*, or gnat-curtain, to be the same as the *amphiblestron* of Herodotus, when in fact, except in the advantages derived from each, they have no more similarity than the paper bags used for covering grapes have with a cherry-tree net †.

In concluding these imperfect remarks, I hope, in order to put beyond question the accuracy, or the contrary, of the statement of Herodotus, that such of the members of the Entomological Society as may have an opportunity will make experiments as to the efficacy of nets in excluding gnats from beds, noticing particularly whether the result be affected by the circumstance of the room being light or dark, or by the colour of the threads or the size of the meshes; and I trust also that such entomologists as may hereafter travel in Egypt will direct their attention both as to the exact species of gnats which may abound there, and as to the fact whether the fishermen still defend themselves from them in the mode pointed out by Herodotus.

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† In a curious poetical tract, entitled "An Epistle from the Fens to Mr. *** *** at Rome," dated May 1, 1727, which my friend the Rev. F. W. Hope, F.R.S., purchased at Mr. Heber's late sale, and which he has had the goodness to show me since the above was written, the author falls into the same error with all the com-

III. *Descriptions of some hitherto uncharacterized exotic Coleoptera, chiefly from New Holland. By the Rev.* F. W. Hope, *M.A., F.R.S., L.S., &c.*

[Read December 2, 1833.]

Order COLEOPTERA.

Family Gyrinidæ?

Adelotopus*, *Hope*. (Genus novum.)

Antennæ 11-articulatæ, articulo 1mo maximo, 2do minori rotundato, 3tio parvo, tenui, hoc et reliquis clavam elongato-ovalem, compressam efformantibus.

Caput breve in thoracem ad oculos immersum.

Labrum transversum, margine antico fere recto.

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mentators in referring, in the following lines, to the passage of Herodotus in question, which he quotes:

> "See with delight the great relief appears,
> Known by the fame of twice a thousand years;
> See the close net of size immense and deep
> Flows round the bed and guards the dome of sleep.
> What though the gnats incessant wave their wings,
> Vain their efforts, and harmless are their stings.
> Soon as their swarms the adverse bound beset,
> Checked they retire, nor pass the impervious net."

He here, like the commentators, regards the modern gnat-curtain as precisely identical with the *amphiblestron* of Herodotus, without giving himself the trouble to point out how his epithets 'close' and 'impervious' could be applicable to a casting-net.

* *ἀδηλος incertus*, et *τοπος locus.*

Mandibulæ validæ, corneæ, externe convexæ, apice subacutæ, interne dentibus binis obtusis armatæ.

Maxillæ lobo interno acuto, falciformi, ciliis rigidis interne armato; lobo externo palpiformi, 2-articulato.

Palpi maxillares breves, 4-articulati; articulis tribus prioribus æqualibus; ultimo ovato, truncato.

Mentum magnum, corneum, valde emarginatum; dente medio obtuso.

Palpi labiales 3-articulati, articulo 1mo minimo, 2do paullo majori, 3tioque maximo truncato.

Corpus parvum, oblongum, antice posticeque rotundatum.

Thorax conicus, antice abrupte truncatus, parte posticâ latitudinem elytrorum æquante; ad latera valde deflexus.

Prosternum acutum, inter pedes anticos protensum.

Pedes breves; femoribus ovato-dilatatis, tibiarum basin fossulâ recipientibus.

Tarsi simplices, 5-articulati, longitudine tibias æquantes. *Ungues* recti.

Adelotopus Gyrinoides. Plate I. fig. 1.

Ater, nitidus; marginibus thoracis pedibusque piceis.

Long. corp. lin. 2¼, lat. lin. 1.

In museo Dom. Hope.

Habitat in Nova Hollandia.

Caput atrum. Thorax concolor, marginibus lateralibus parum reflexis piceis. Elytra marginata, abrupte truncata, sparsim punctulata; punctis, sub lente, parum distinctis. Corpus infra nigrum, nitidum; segmentis abdominis postice, pedibusque piceis.

This singular insect was sent to me from the Swan River settlement in New Holland. It seems to unite in itself the characters of several families. From the tarsi it is referrible to the *Pentamera*, whilst its general appearance and clavate antennæ place it among the *Necrophaga*. By the subcontractile legs, (for the bent tibiæ are not entirely concealed within the femora,) it is allied to *Byrrhidæ*, but the leading character afforded by the maxillæ evinces a near affinity with the *Entomophaga*, amongst which the *Gyrinidæ* must be considered the nearest in proximity, *Gyrinus bicolor*, Fab., somewhat approaching this insect in form.

Family BYRRHIDÆ.

MICROCHÆTES*, *Hope*. (Genus novum.)

Antennæ 11-articulatæ, clavatæ, articulo 1mo magno, 2do paullo mi-

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* *μικρος parvus*, et *χαιτη capillus*.

nore, quinque proximis longitudine decrescentibus, 8vo paullo latiori cyathiformi, binis proximis lunulatis, ultimo maximo conico ovato.

Labrum breve, transversum, antice ciliatum.

Mandibulæ trigonæ apice 3-dentatæ, sinu interno infra dentes membranaceo.

Maxillæ lobis binis valde ciliatis, interno breviori.

Palpi maxillares 4-articulati, 1mo brevi, 2do duplo longiori, 3tio brevi, ultimo elongato ovato.

Mentum transversum antice vix emarginatum.

Labium membranaceum, basi dilatatum, apice rotundatum.

Palpi labiales 3-articulati, breves, articulo ultimo binis præcedentibus conjunctim æquali.

Corpus orbiculare, setulis obsitum.

Pedes breves, compressi, contractiles; femoribus dilatatis, posticis solummodo versus basin dente obtuso externe armatis.

This insect approaches in its antennæ and setose body to the genus *Nosodendron*, but the oral structure is more nearly allied to that of *Byrrhus*. The 3 basal joints of the tarsi are strongly ciliated, while the 4th is naked, and seems almost incorporated with the 5th joint. The tubercles on the thorax and elytra are formed of short rigid hairs.

Microchætes sphæricus. Plate I. fig. 2.

Totum corpus supra nigrum, fusco tomentosum; pedibus piceis.
Long. corp. lin. 2, lat. lin. 1¼.
In museo Dom. Hope.
Habitat in Nova Hollandia apud Swan River.

Clypeus rotundatus, subtiliter punctulatus. Thorax 4 tuberculis notatus, medio dorsi fere positis. Elytra tuberculis horrentia, tuberculis triplici serie dispositis. Corpus subtus concolor.

Family ELATERIDÆ.

MACROMALOCERA*, *Westwood MSS.* (Genus novum.)

Antennæ corpore paullo longiores, compressæ, 12-articulatæ, articulo 1mo crasso, binis proximis minutis æqualibus fere rotundatis, 3tio autem supra basin articuli sequentis extenso, reliquis longitudine æqualibus, depressis, apice singuli interne acute paullo producto, ultimo apice subconico.

Mandibulæ falcatæ, apice acutæ, basi excavatæ.

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* *μακρος longus, ὁμαλος planus,* et *κερας cornu.*

Labrum sublunulatum.

Maxillæ parvæ, subquadratæ, externe longe pilosæ, lobo unico apicali fere trigono tomentoso.

Palpi maxillares 4-articulati, breves, articulo 1mo minimo, reliquis æqualibus, apice latioribus, ultimo autem subtrigono truncato.

Palpi labiales in scapos duos inserti, 3-articulati, articulis fere æqualibus rotundatis, apicali autem paullo majori.

Mentum transverso-quadratum, antice medio parum producto.

Labium parvum, subrotundatum.

Prosternum acutum, in foveola mesosterni receptum.

Pedes longissimi, tarsique tibiis longiores.

Macromalocera Ceramboides, Hope. Plate I. fig. 3.

Flava, elytris concoloribus lineato-punctatis.

Long. corp. lin. 11, lat. lin. 2.
In museo Dom. Hope.
Habitat in Nova Hollandia.

Antennæ compressæ. Caput foveolâ inter oculos impressâ. Thorax marginatus, subconvexus, angulis posticis paullo elongatis, antice posticeque capillis aurantiis obsitus. Scutellum atrum. Elytra lineato-punctata, pubescentia. Corpus infra concolor, tarsis subtus auricomatis.

Macromalocera cœnosa, Hope.

Præcedenti affinis. Corpus supra infraque fuscum; antennis, sutura, marginibusque elytrorum flavescentibus.

Long. lin. 11, lat. lin. 2.
In museo Dom. Hope.
Habitat cum præcedenti.

This insect, as well as the former species, was sent to England by Captain Roe from the vicinity of the Swan River. None of the *Elateridæ* approach them in the length of the antennæ, from which I have chiefly drawn the generic characters; and I think it is not improbable that *Buprestidæ*, somewhat approaching this genus, will eventually be found in the same wonderful country.

Family TENEBRIONIDÆ.

SCOTÆUS[*], *Hope*. (Genus novum.)

Antennæ subpectinatæ, ante oculos sub margine capitis insertæ, 11-articulatæ, articulo 1mo crasso, 2do brevi minimo, 3tio binis anterioribus fere æquanti, septem proximis trigonis, apicibus acute productis, ultimo paullo minore.

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[*] *σκοταιος tenebricosus.*

Maxillæ lobo externo magno, inermi, ciliato, interno parvo.

Palpi maxillares 4-articulati, articulo 1mo parvo, 2do duplo longiori, 3tio parvo fere cyathiformi, ultimo securiformi maximo.

Prosternum inter pedes anticos acute productum et in carinam mesosterni receptum.

Metasternum inter pedes intermedios obtuse productum.

Caput fere quadratum, angulis anticis acutis rotundatis.

Labrum transversum, antrorsum pilosum.

Oculi reniformes, septo antice subdiviso.

Pedes mediocres. *Tarsi* articulo ultimo valde elongato.

Scotæus Corallipes. Plate I. fig. 4.

Niger, antennis subpectinatis, femoribus tibiisque rubro-corallinis tarsisque atris.

Long. corp. lin. 9, lat. lin. 3¼.

In museo Dom. Hope.

Habitat in Java.

Labrum antice pilosum. Caput punctatum, oculis aureo-micantibus. Thorax convexus, punctis numerosis irregulariter sparsis, fossulâ mediâ parum distinctâ, medio dorsi ad scutellum decurrente. Elytra nigra, lineato-punctata. Corpus infra atrum nitidum, femoribus tibiisque rubro-corallinis, tarsisque nigris infra pubescentibus. Antennæ nigræ.

Family CURCULIONIDÆ.

LOPHOTUS, *Schonherr.*

Loph. nodipennis, Hope. Plate I. fig. 5.

Ater, rostro canaliculato postice niveo, elytris unituberculatis, maculâque albidâ inter tuberculas et apicem positâ.

Long. corp. lin. 10, lat. lin. 2¼.

In museo Dom. Hope.

Habitat apud Conception Americæ Meridionalis.

Caput nigrum, rostro brevi in medio canaliculato, postice capillis albidis obsito. Inter oculos spinæ duæ atræ serie setarum constructæ. Thorax cylindricus, antice constrictus, subtilissime punctatus. Elytra striato-punctata, postice spinâ elevatâ acutâ utrinque armata. Macula alba fere trigona utrinque inter spinas et apicem elytrorum extensa. Corpus infra nigrum, maculis argentatis notatum. Pedes nigri, femoribus incrassatis posticeque albo marginatis.

This singularly formed insect was brought by Mr. H. Cuming

from Conception: it belongs to the genus *Lophotus*, Schonherr, to whom I sent it, with another new species, named by me *L. trifasciatus*, also from Valparaiso. In the second volume of Schonherr's work, one species only is given, viz. *L. Eschscholtzii*. The *Curculio Vitulus*, Fab., however, must be considered as the type of the genus, which consequently comprises four distinct species.

Family PRIONIDÆ.

PRIONUS, *Fabricius*.

Prionus pilosicollis. Plate II. fig. 1.

Piceus; thorace bidentato, dentibus postice arcuatis, piloso; antennis pedibusque rubro-piceis.

Long. corp. lin. 12¼, lat. lin. 6.

In museo Dom. Hope.

Habitat in Nova Hollandia apud Swan River.

Antennæ compressæ, rubro-piceæ, fere longitudine corporis. Caput punctulatum, antice densius pubescens. Thorax capillis elongatis auratis obsitus, utrinque postice dente acuto, retrorsum arcuato armatus. Elytra serie irregulari punctorum excavatorum insculpta. Corpus infra aureo-pilosum. Pedes rubro-picei; tibiis externe spinosis, anticis arcuatis.

Family LAMIIDÆ.

DECARTHRIA*, *Hope*. (Genus novum.)

Antennæ corpore longiores, 10-articulatæ, articulo 1mo crasso, 2do minimo, reliquis longitudine æqualibus, ultimo apice acuto.

Caput supra breve, facie transverso-quadratâ, oculisque quatuor insignitâ, binis supra basin antennarum positis, binisque majoribus lateralibus.

Labrum semirotundatum, ciliatum.

Mandibulæ subfalcatæ, acutæ, basi incisurâ notatæ.

Palpi maxillares 4-articulati, articulo 1mo minimo, 2do præcedenti duplo longiori, 3tio fere trigono, ultimo elongato conico acuto, tribus primis longitudine æquali.

Maxillæ lobis duobus elongatis apice ciliatis.

Mentum breve, transversum.

Labium productum, basi angustatum, apice ciliatum.

Palpi labiales 3-articulati, articulo 1mo minimo, binis sequentibus fere æqualibus, ultimo apice conico.

Decarthria Stephensii, Guilding's MSS. Plate II. fig. 2.

Pallide testacea, antennis variegatis elytrisque nigro maculatis.

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* *δεκα decem, ἄρθρον articulus.*

Long. corp. lin. ¾, lat. lin. ¼.
In museo Dom. Hope.
Habitat in Insula Sancti Vincentii Indiæ Occidentalis.

Antennæ corpore longiores, testaceæ; articulis (secundo excepto) apice nigricantibus. Caput flavum. Thorax margine anteriori flavo, disco postice fuscanti. Elytra testacea, basi punctata, humeris medio prominentibus, nigro maculata, macula obscura media magna quadrata, 2da apicali 3tiaque intermedia minori. Corpus infra fusco-testaceum, tibiis anticis emarginatis, intermediis unispinosis.

This is the smallest Capricorn insect that has come under my notice. It appears closely allied to the genus *Mesosa* of Megerle, from which I have separated it, as the antennæ have only ten articulations, whereas the latter has eleven. It was captured in the Island of St. Vincent's by the Rev. Lansdown Guilding, and named in honour of J. Francis Stephens, Esq. The eyes are similar to those of the genus *Tetraopes*; and the incrassated legs, with regard to the size of the insect, are remarkable.

STENODERUS, *Dejean*.

Stenoderus Roei. Plate II. fig. 3.

Niger; thorace antice constricto, elytris rubris, antennis in medio penicillatis.
Long. corp. lin. 10, lat. lin. 2.
In museo Dom. Hope.
Habitat in Nova Hollandia apud Swan River.

Caput porrectum, nigrum, inter oculos canaliculatum. Mandibulæ atræ, acutæ. Antennæ nigræ, articulo basilari longo, apiceque crassiori, tertio fasciculo pilorum ornato. Thorax antice angustatus, constrictus, utrinque subspinosus, supra tuberculatus. Scutellum atrum, postice rotundatum. Elytra rubra, elevato-quadrilineata. Corpus subtus nigrum, nitidum; pedibus concoloribus.

The following species belong to the genus *Stenoderus*, viz.

1. *Stenoderus suturalis*, Oliv. East Indies.
2. ——— { *abbreviatus*, Fab. *Cerambyx*, Syst. Eleuth. 2. 275.
   ceramboides, Kirby. }
3. ——— *concolor*, M'L.
4. ——— *Roei*, Hope.

I have named this last species in honour of Lieut. Roe, R.N., whose arduous services in surveying the coasts of Australia will be more properly appreciated as that country becomes better known.

5. *Stenoderus pulcher.*

Flavus; antennis nigris, elytrisque postice cyaneis.
Long. lin. 6¼, lat. lin. 2.
In museo Dom. Hope.
Habitat in Nova Hollandia.

Caput porrectum, supra et subtus flavum. Antennæ nigræ. Thorax obscure flavus. Scutellum concolor, postice rotundatum. Elytra basi aurantia, apice cœrulea, nitida, elevato-quadrilineata. Corpus infra cyaneum, nitidum; femoribus quatuor anticis flavis; tibiis tarsisque nigris; pedibus posticis concoloribus.

I perfectly agree with Mr. Kirby that this genus recedes from the *Lepturidæ*: it belongs undoubtedly to the *Cerambycidæ*, and appears to have some affinity with the South American *Rhinotragus* of Dalman and *Cosmius* of Klug; it agrees with both in regard to the produced head, and with the latter in having the antennæ sometimes penicillated.

Tragocerus, *Dejean.*

Tragocerus Spencii. Plate II. fig. 4.

Aurantius; thorace nigro elytrisque nigro-bifasciatis.
Long. lin. 16, lat. lin. 4¾.
In museo Dom. Hope.
Habitat in Nova Hollandia.

Caput antice rufo-piceum, medio pilis flavescentibus ornatum, foveolatum, posticeque atrum. Antennæ setaceæ, elytris breviores, rufo-piceæ. Thorax ater, nitidus, subvillosus, ad latera pilis flavescentibus indutus, marginibusque lateralibus in medio subunidentatis. Scutellum atrum. Elytra abdomine longiora, apice angustiora, dehiscentia, truncato-subemarginata; suturâ lineisque quatuor in utroque elevatis longitudinalibus, quarum exterior vix distincta, binæ sequentes æquales e humeris ad apicem extensæ quartaque interna e latere scutelli decurrens et paullo ante apicem terminata. Elytra parum nitida, fasciâ mediâ nigrâ deflexâ, secundâ posticâ latiori. Thorax subtus et pectus atra, cinereo-pubescentia. Abdomen antice posticeque rufo-piceum, segmentis tribus internis nigris nitidis. Segmenta basi utrinque albo-maculata, ultimo solummodo excepto rufo.

I have considered this very beautiful insect as not unworthy to bear the name of our distinguished countryman and Honorary Member, William Spence, Esq., F.R.S. &c., whose labours, in conjunction with those of our Honorary President, have tended to give to our favourite science the greatly increased degree of general attention with which it is now regarded.

I propose dividing *Tragocerus* into two sections, viz.

α. Elytris apice bidentatis.
β. Elytris apice rotundatis.

These characters, however, it is to be observed, may hereafter be ascertained to be sexual instead of sectional.

To the former section belong,

1. *bidentatus*, Don.
2. *Spencii*, Hope.
3. *flavicomus*, Hope. (Sp. nov.)
4. *Lepidopterus*, Schreibers.

To the latter belong,

5. *fasciatus*, Don.
6. *sulphurifer*, Hope.

PACHYLOCERUS*, *Hope*. (Genus novum.)

Antennæ crassæ, elytris breviores, 11-articulatæ, articulo 1mo maximo, 2do minimo, tribus sequentibus fere rotundatis, quinque proximis subtrigonis apice interno productis subpubescentibus, ultimo fere ovali, apice subarticulato.

Caput quadratum, angulis posticis rotundatis, antice canaliculatum, lineis binis elevatis, clypeo excavato, posticeque foveâ inter oculos et antennas fortiter impressâ.

Labrum parvum, transversum, antice subemarginatum.

Mandibulæ breves, interne dentatæ.

Palpi maxillares breves, articulis tribus primis æqualibus, ultimo magno, conico, apice truncato.

Palpi labiales articulis duobus basalibus æqualibus, tertio magno conico, apice truncato.

Mentum breve transversum.

Thorax antice posticeque constrictus, transverse rugosus.

Prosternum inter pedes anticos paullo productum.

Pachylocerus corallinus. Plate II. fig. 5.

Rubro-corallinus; thorace rugoso nigro-maculato, elytris rubris vittisque nigris variegatis.

Long. lin. 13, lat. lin. 3¼.

In museo Dom. Smee.

Habitat in India Orientali.

Antennæ rubro-ferrugineæ, articulo 2do nigro, duobus proximis apice nigricantibus, reliquis colore pallidiori saturatis. Thorax ruber, rugosus, antice et postice lineâ nigrâ elevatâ marginatus, dorso maculis binis atris oblongis notatus. Scutellum nigrum. Elytra rubra, suturâ, marginibus lateralibus, e medio disci ad apicem nigricantibus, vittisque duabus nigris notata, vitta interna basi interruptâ. Corpus subtus atrum, thorace rubro, abdomine nigricante. Pedes rubro-corallinæ femoribus apice nigris, geniculisque concoloribus.

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* *παχυλος crassus, κερας cornu.*

This singular insect inhabits the vicinity of Omlecope Dawar in the East Indies, and was captured on a prickly thorn by Captain Smee, from whose cabinet it is described. *Cerambyx crassicornis*, Olivier, is the only species allied to it, the locality of which is not given by that author; I have little hesitation, however, in asserting it to be an Indian species.

DESCRIPTION OF THE FIGURES.

Note.—The line placed near some of the insects indicates their natural length.

PLATE I.

Fig. 1. *Adelotopus Gyrinoides*, magnified. 1 *a*. The under side of the insect. 1 *b*. The under side of the head. 1 *c*. Labrum. 1 *d*. Mandible. 1 *e*. Maxilla. 1 *f*. Labium. 1 *g*. Antenna. 1 *h*. The same, seen sideways. 1 *i*. Prothorax and fore legs, seen from the front. 1 *k*. The intermediate legs. 1 *l*. The hind pair of legs.

Fig. 2. *Microchætes sphæricus*, magnified. 2 *a*. Labrum. 2 *b b*. Mandibles. 2 *c*. Lower parts of the mouth. 2 *d*. Antenna. 2 *e*. Fore leg. 2 *f*. Ditto, folded up. 2 *g*. Hind leg.

Fig. 3. *Macromalocera Ceramboides*, natural size. 3 *a*. Under side of the front of the body. 3 *b*. Front of head. 3 *c*. Maxilla. 3 *d*. Labrum and its parts. 3 *e*. Extremity of tarsus and ungues.

Fig. 4. *Scotæus corallipes*, natural size. 4 *a*. Under side of the pro- and meso-thorax. 4 *b*. Maxilla. 4 *c*. Antenna.

Fig. 5. *Lophotus nodipennis*, natural size. 5 *a*. The head, seen sideways.

PLATE II.

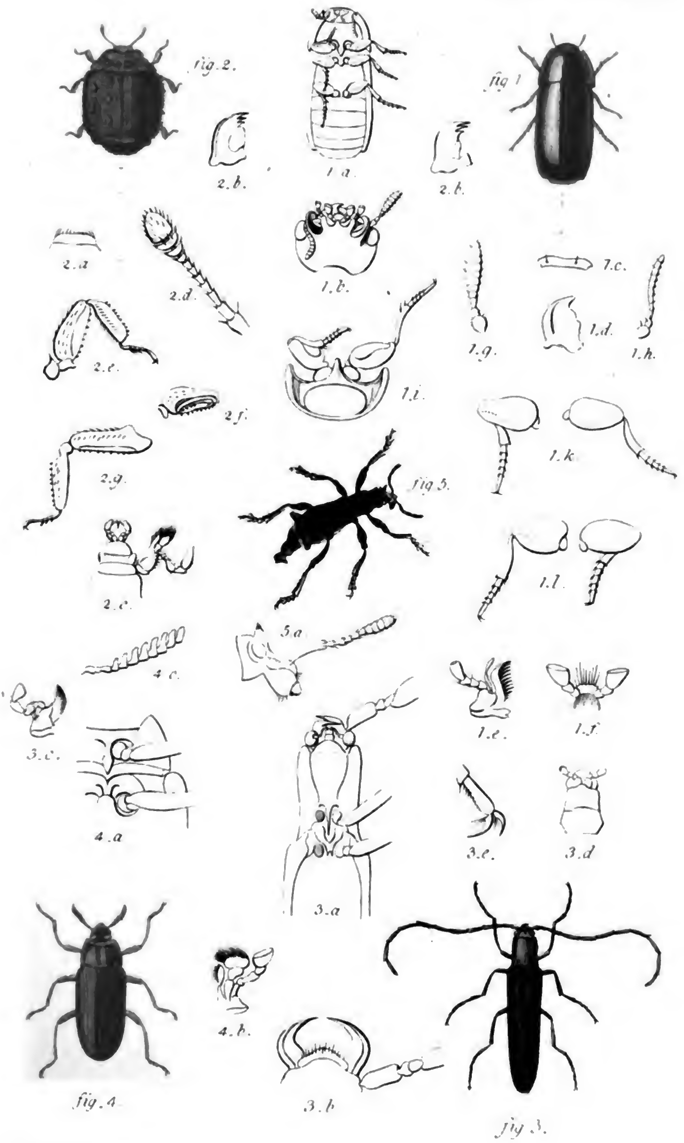
Fig. 1. *Prionus pilosicollis*, natural size. 1 *a*. Under side of the front of the head.

Fig. 2. *Decarthria Stephensii*, magnified. 2 *a*. Head, seen from the front. 2 *b*. Ditto, sideways. 2 *c*. Labrum. 2 *d*. Mandible. 2 *e*. Maxilla. 2 *f*. Labium and its parts. 2 *g*. The insect, of the natural size.

Fig. 3. *Stenoderus Roei*, natural size. 3 *a*. Front of head. 3 *b*. Under side of ditto.

Fig. 4. *Tragocerus Spencii*, natural size. 4 *a*. Front of head, from above. 4 *b*. Ditto, from beneath, showing the parts of the mouth. 4 *c*. Maxilla.

Fig. 5. *Pachylocærus corallinus*, natural size. 5 *a*. Front of head. 5 *b*. Under side of ditto. 5 *c*. Prosternum.



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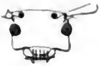

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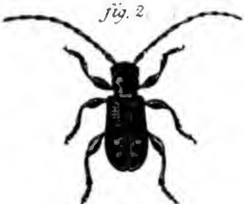

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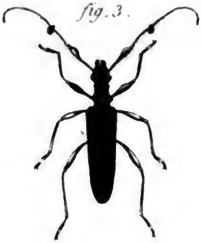

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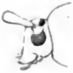

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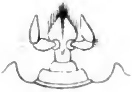

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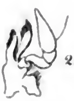

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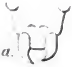

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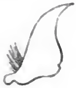

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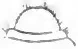

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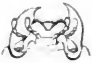

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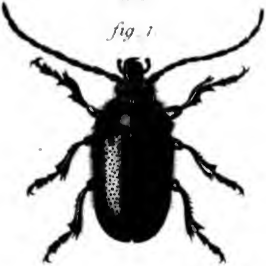
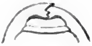


fig. 1



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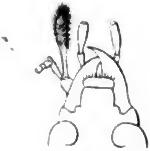

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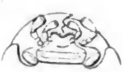

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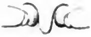

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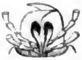

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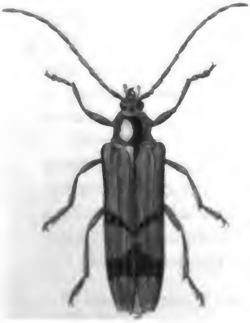

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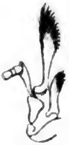

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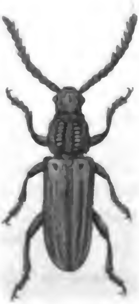
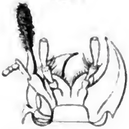


fig. 5.



4. b

J. O. W. del^t

J. Swaine Sc.

IV. *Explanation of the sudden appearance of the Web-spinning Blight of the Apple, Hawthorn, &c. By* R. H. LEWIS, *Esq., M.E.S.*

[Read January 6, 1834.]

THERE is, perhaps, no "blight" which, in its later stages, has attracted more attention, or the devastation caused by which is so well known, as that which infests the apple, whitethorn, and various other trees; yet, as far as I have been able to ascertain, its early history has hitherto been veiled in obscurity. The œconomy of the species of insect to which it is attributable was fully investigated during the last season by my brother, E. W. Lewis; but his death and my not being able to find his notes, prevent that minute detail which would otherwise have been given. The following observations have been drawn up from some notes which I made at the time.

The mother moth (*Yponomeuta padella*, Linn.,) deposits her eggs in the preceding year, generally on the small twigs, and chiefly on their under surface, in a circular patch about 1¼ line in diameter, which she covers over with a strong gluten, at first of a pale yellow, but which is afterwards, by the action of the atmosphere and rain, changed to a dark brown, very closely resembling the bark of the tree, and is then very difficult to be distinguished from it.

The eggs hatch early in the autumn*, and the larvæ remain in confinement during the whole winter, under the covering which is formed by the gluten and egg-shells. If we now raise up one of these excrescences we shall find it hollow inside, and containing two dozen or more larvæ, of a pale yellow colour, with the head and a corneous plate on the first segment black, and about half or two thirds of a line long. In these receptacles they increase somewhat in size; the bark of the tree beneath is moist and green, but whether, or in what manner, they derive nourishment from it I am at a loss to say.

About the time that the trees are coming into leaf they make their escape; but they do not now commence spinning webs,—they cannot yet eat the epidermis of the leaves, and they require some protection from the cold and rain, which their tender frames are not yet fitted to endure; to effect which they *mine* into the leaves, eating the parenchyma only, and leaving the epidermis untouched.

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* The exact time I did not ascertain: I found them hatched the beginning of October.

Having acquired sufficient strength to withstand the vicissitudes of the atmosphere, and to devour the epidermis of the leaves, they make their way out, and the anxious gardener, who has hitherto only observed the brownness of the leaves, caused by the mining, but which is by him attributed to the withering blast of an easterly wind, is astounded when he perceives myriads of caterpillars swarming on the trees, and proceeding with alarming rapidity in their devastating course. The fact of their mining sufficiently explains the reason of their sudden appearance: it shows how one day not a single caterpillar may be visible on the trees, and the next they may be swarming with larvæ of so large a size as to rebut the idea of their having been recently hatched. Various conjectures have been made to explain this puzzling fact, but it is unnecessary for me now to detail them. Even had the naturalist detected them in the leaves, he would scarcely have thought them the same, their present habits differing so much from those which they afterwards assume; in addition to which they are now of a yellowish colour, though they become darker at each change of skin. It is in this state that I would recommend their destruction, by gathering and burning every leaf which by its outward appearance betrays the internal ravages. Their nests are so difficult to discover that searching for them seems entirely out of the question, and I am much afraid that could any wash be conveniently applied to the small twigs, whatever might be sufficiently powerful to penetrate the glutinous covering, would at the same time injure the tree. This, however, I leave to those more acquainted with practical gardening than myself.

The future proceedings of the insects, while they cover the trees with their webs, have been so well described by others, and are altogether so well known, as to need no description here.

Having satiated themselves with the growing hopes of the gardener, who endeavours, but in vain, to stop their destructive career, they prepare for the pupa state by spinning strong white cocoons of an ellipsoidal form. I mention this fact because an anonymous writer has recently given, in a periodical work confined to our favourite study, an amusing though erroneous account of the habits of this moth.

In a short time they emerge from their pupæ, and may be seen in the evening, but more particularly in the early morning, flying by hundreds round those devoted trees which are, in the following year, to be the scene of similar ravages, unless circumstances for which we cannot account should prevent their multiplication.

V. *Description of the Larva and Pupa of* Raphidia Ophiopsis. *By* G. R. WATERHOUSE, *Esq., Curator of the Entomological Society.*

[Read January 6, 1834.]

RAPHIDIA OPHIOPSIS *Schumel?*.

Larva and Pupa. Plate III. fig. 1.

ABOVE light brown, with longitudinal stripes of a deeper colour; beneath yellowish white, with longitudinal brown stripes. Head and prothorax glossy black. Body 12-jointed.

Length 6—7 lines.

Head elongate, depressed, smooth, with two stemmata in the anterior angles near the base of the antennæ. *Antennæ* 4-jointed, the basal joint short and stout; second elongate, cylindrical; third equal to the second in length, growing gradually thicker, but suddenly narrowed towards the apex; terminal joint slender, elongate, growing gradually thicker to the apex, which is furnished with short bristly hairs, and a small protuberance. *Labrum* transverse, quadrangular, indistinctly rounded anteriorly. *Clypeus* transverse, quadrangular. *Labium* minute. *Palpiger* triangular. *Labial palpus* 4-jointed, terminal joint slender; basal short and cylindrical. *Mandibles* moderate, armed with a large acute tooth, not far from the apex, which is rather elongate and acute. *Maxillæ* elongate, soft and fleshy; blade simple. *Maxillary palpus* 4-jointed, the basal joint short; second and third moderate, equal; terminal conic, with minute bristles at the apex.

Body elongate, soft, pubescent, dilated in the middle, and furnished with six equal and moderately long legs, each with a bifid claw at the apex. *Prothorax* corneous, elongate, rounded anteriorly and posteriorly, the disc depressed.

1 *a.* The larva, magnified. 1 *b.* The under side of the head. 1 *c.* Antenna. 1 *d.* Labrum. 1 *e.* Clypeus. 1 *f.* Palpiger. (Newm.) 1 *g.* Mandible. 1 *h.* Maxillæ. 1 *i.* Fore leg. 1 I. Claw of ditto.

It may seem rather unnecessary to add one more to the several accounts already published of the larva and pupa of *Raphidia*, especially since a figure and description of them has very recently appeared in the 'Magazin de Zoologie' by M. Percheron; but I was fearful that the confident manner in which he speaks might put a stop to further inquiry in a matter which I think not fully investigated. M. Percheron seems rather hastily to have set aside two of the greatest authorities, viz. Linnæus and Latreille, who were both acquainted with the larva and pupa of this insect: the latter, who reared it, states that the remarks of the former are correct, and the observations which I have made induce me to be of the same opinion.

I insert, for the purpose of comparison, a translation of the description of M. Percheron. It will be seen, on comparing his description, and that in which Linnæus, Latreille and myself concur, that much difference existed in the specimens. It is extraordinary that such a difference should exist, even though they may have been larvæ of different species.

M. Percheron's account is as follows:—"The larva lives under " the bark of trees, where it is sometimes found, but not very com" monly; it is carnivorous, and probably feeds upon other small " larvæ of *Arachnides* and *Onisci*, which prefer that situation; it does " not walk very quickly, but the movements of its body are per" formed with so much violence, and with such a degree of undula" tion, as to give it the appearance of a serpent, to which it has " been compared. The larva is oblong; the head is nearly square, " rounded posteriorly; the mouth is formed as in the perfect insect; " the maxillary palpi are four-jointed; the labial three; the man" dibles are unidentate anteriorly; the eyes are composed of seven " little black points, disposed as follows, viz. six in a circle, and a " seventh a little in advance; the antennæ are three-jointed, dimi" nishing progressively in length; the legs are as usual; the femora, " tibiæ and tarsi of a single joint each, and are almost equal in " length, a double claw terminates the last; the anterior legs are " double the size of the four posterior. The head and the prothorax " which forms its only thorax, are of a shining brown; the body is " of a greenish black, with two yellow bands upon the segments; " the legs, the antennæ and the labrum yellowish.

" After remaining more or less time in the larva state, which it " often does during the whole of the winter (in consequence of the " eggs being hatched late in the season), the insect changes into " the imago in the same place in which it has lived, without making " any cocoon, but at this moment there is a delicate operation to " be performed.

* * * * * *

" This pupa is a true chrysalis, not like that of the *Lepidoptera*, but " like that of the *Coleoptera*: all the parts of the body, without being " attached to each other, are covered with a membrane which hin" ders the action, yet the whole body has the same faculty of con-

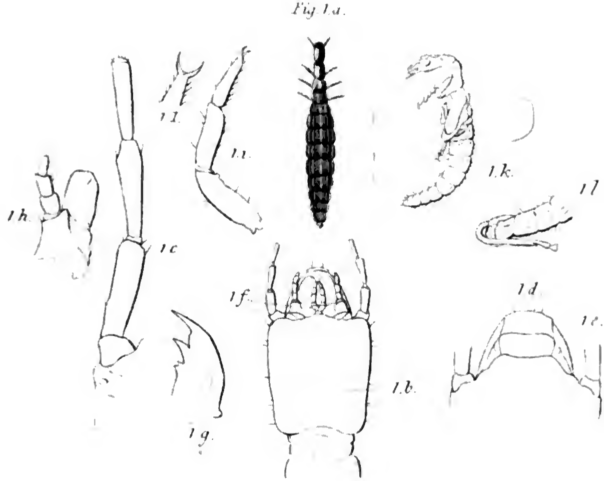
Fig. 1.a.
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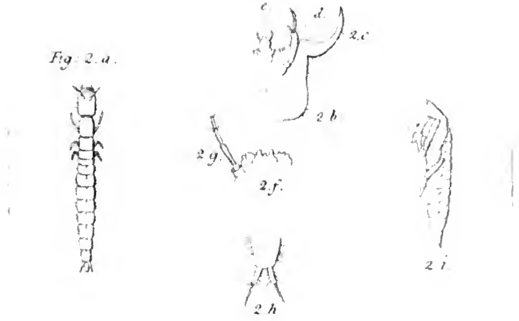
Fig. 2.a.
c.
d.
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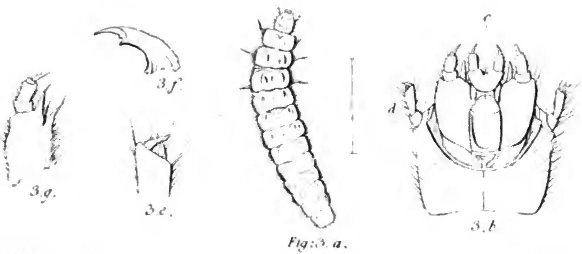
3.f.
3.g.
3.e.
c
d
3.b.
Fig. 3.a.

" torsion and leaping, which the larva practises in so great a degree.
" Linnæus had said that this pupa was active, but this is a mistake;
" but it is more astonishing that Latreille, who says he has reared
" it, has not mentioned this larva, and has continued, in his subsequent works, to refer this matter to the observation of Linnæus,
" which has been followed by all the other entomologists. The larva
" changes to its perfect state at about the end of fifteen days."

The description M. Percheron gives of the movements of the larva which he observed very well, agrees with what I have observed in mine; but, although I have found about a dozen specimens, I never detected one *under*, but always *in*, the bark: this is of some little consequence; for if the animal eats its way *into* the bark of the tree, and there remains, it is unlikely that it feeds upon the *Onisci* and *Arachnides*. Of the fact of the insect's eating its way into the bark, I have had an opportunity of being well satisfied, having discovered six or seven specimens in one tree: they had invariably formed chambers for themselves, close to the outer surface of the bark; the tree was sound, and tolerably smooth outside. I found no wood-feeding larvæ in the tree, nor any traces of them. The holes made by the *Raphidiæ* were so large as to induce me to think that they had not been elsewhere since leaving the egg. The grains of wood filling up the parts of the cell not occupied by the insect had the appearance of having been digested. Upon reaching home with the larvæ, I put one into a pill-box, with a small piece of wood, which it immediately began to bite vehemently, and continued to do so until I was convinced of its intention. The wood being very hard, I put the larva into a box with a piece of bark: it crawled to the under side, and in the course of a day or two had constructed itself a cell resembling those which I found in the tree.

At the time that I reared the insect (which was some years ago), thinking that the larva was carnivorous, I put several larvæ of *Scolytus* and other insects in the jar with that of *Raphidia*, but not one of them was touched. Lately I have tried the experiment in various ways. I put two specimens of *Raphidia* larva into a pill-box, with several wounded larvæ; the result was the same. But with all these circumstances, which seem to disprove that this animal is carnivorous, I must confess that I am too reluctant to give up theory to be convinced to the contrary, until I have ascertained that the insect may be reared upon bark alone*.

M. Latreille's description of the larva differs from that of M.

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* In support of the opinion that the insect in question is not lignivorous, it will be recollected that the larva is extremely active, that it is provided with long antennæ, and that its jaws are not so short and strong as those of insects which are

Percheron, in the number of joints of the maxillary palpi and antennæ, a difference very easily accounted for in larvæ; for one person might consider the peduncle at the base of the antennæ as a joint, whilst another would consider it as a part of the head. Again, the process at the apex of the antennæ, and that at the base of the third joint, might be considered by some as distinct joints, whilst others would not be of this opinion. In these cases one may generally determine by the examination of allied species in which those parts become most developed. I have considered the peduncle in this case as a distinct joint, because it is flexible, like the other joints of the antennæ, and of the same substance; the other parts being very indistinct, and the antennæ being usually four-jointed in larvæ, I have not considered them as joints. But in the number of eyes there is a considerable difference, the insect observed by Latreille and myself having two; whilst that by M. Percheron has seven. In the pupa there is, however, the greatest difference, the one described by the latter being *quiescent*, that by the former *active*, or possessing the power of locomotion. At the time of rearing the insect, which was in the year 1827, I did not see the pupa, but found its case attached to the gauze covering of the jar in which the larva was kept: from this circumstance, and knowing that the larva could not have changed in that situation, I was induced to form the conjecture that the pupa was an active one. Having, however, lately reared more specimens, and carefully observed their metamorphosis, I have discovered that this pupa in some respects approaches the active pupæ, although it cannot be strictly considered as such, until immediately before assuming the *imago* state, when the insect having gained sufficient strength is

ascertained to be lignivorous. The form, also, of the insect of which we are speaking is different from that of the generality of wood-feeding larvæ.

However different the form of insects may be in their perfect state, their larvæ, if their habits be alike, are also similar in general appearance; and this applies even where they may be of different orders. Compare the larva of *Cossus ligniperda* with that of a *Cerambyx*; again, the larva of *Trichiosoma* with those of the *Lepidoptera*. Indeed, the shape of the perfect insect seems to be very little influenced by that of the larva. It is a curious fact, however, that in the larvæ which I possess, of two allied genera of the *Cerambycidæ*, the antennæ vary in inverse proportion to those of the perfect insects. In *Lamia nubila* there are distinct rudimentary antennæ; in *Acanthocinus ædilis* the rudiments of antennæ can scarcely be traced, while in the perfect state the latter has the longest antennæ of any Coleopterous insect found in England. It may also be observed, that although the larva does not influence the shape of the perfect insect, yet the form of the larva is a very good guide to the natural situation of the perfect insect, as regards its arrangement, (that is when they are of the same order,) for the larvæ of various groups vary but little among each other.

enabled to walk, although inclosed within the pupa-case, which, by the by, is extremely thin. Upon exposing the pupa to the light, it would immediately commence biting the bits of wood beneath it, and make considerable exertions to conceal itself; upon which occasions it sometimes used the two fore legs slightly. It must be observed, however, that although the other parts of the pupa are comparatively weak, the jaws are strong, and of a dark colour, showing that they are not meant to be idle during this state.

I am of opinion that the pupa in its natural state makes its way out of the bark of the tree, just before it turns to the perfect insect, which would account for its being able to walk at that time; for if the pupa were to change within the bark, the perfect insect, with its delicate gauze wings, would be much troubled to get out without damaging them. Hence the accounts of this little animal put us in mind of the story of the Cameleon, where all are right, and all are wrong.

1 *k*. The pupa of the male, magnified. 1 *l*. Part of the abdomen of the female, showing the position of the ovipositor.

VI. *Descriptions of the Larvæ and Pupæ of various species of Coleopterous Insects. By* G. R. Waterhouse, *Esq., Curator of the Entomological Society.*

[Read January 6, 1834.]

Eryx (*Stephens*) niger, *De Geer.*

Larva. Plate IV. fig. 1.

Yellowish white. Head ochreous, corneous. Body elongate, cylindrical, subcoriaceous, 12-jointed.

Length 10 lines.

Head rotundate, slightly depressed, smooth with a V-shaped groove commencing at the base of the clypeus and converging towards, but not quite reaching, the prothorax. *Antennæ* 4-jointed, basal joint short; two intermediate joints cylindrical; terminal joint minute, and placed in a cup-like cavity at the apex of the third joint. *Labrum* transverse, rounded at the sides, and truncated anteriorly, the exterior margins furnished with bristly hairs. *Ligula* minute and conical. *Palpiger* short, divided anteriorly into two lobes, to which are attached the *labial palpi*, which are 2-jointed; basal joint short and cylindrical; terminal joint minute and subtruncated. *Labium* quadrangular, the anterior part narrowest. *Insertio* longer than broad, narrower posteriorly. *Mentum* hexagonal. *Mandibles* short and stout, the inner side excavated and armed with a large and rather obtuse tooth; the apex of the right mandible (as viewed beneath) deeply notched; in the left mandible the internal tooth is almost obliterated, and the apex is but slightly notched. *Maxillæ* elongate, the blade subtriangular, armed internally with a series of bristles and a large corneous tooth-like process. *Maxillary palpi* 3-jointed; basal joint short; the second moderate, the part at the apex thickest; terminal joint conic.

Body elongate, cylindrical, furnished with six horny legs, which are attached to the three first segments. *Telum* conical above and excavated beneath. *Mesothorax* transverse; the remaining joints of the body equal.

1 *a*. The larva, magnified. 1 *b*. Antenna. 1 *B*. Apex of third joint, at large. 1 *c*. Labrum. 1 *d*. Ligula. (Newm.) 1 *e*. Palpiger. (Newm.) 1 *f*. Labial palpi. 1 *g*. Labium. 1 *h*. Insertio. (Newm.) 1 *i*. Mentum. 1 *k*, *k*. Mandibles, viewed from the under side. 1 *l*. Maxillæ. 1 *m*. Maxillary palpi. 1 *n*. Fore leg. 1 *o*. Telum, under side.

This larva is not very uncommon in the vegetable mould found in decayed oak-trees.

Obs.—I have given a detailed description of this larva, as I think it may be considered a type of an extensive group, having found several larvæ of allied genera differing so slightly that they might easily be confounded.

CISTELA CERAMBOIDES, *Linn.*

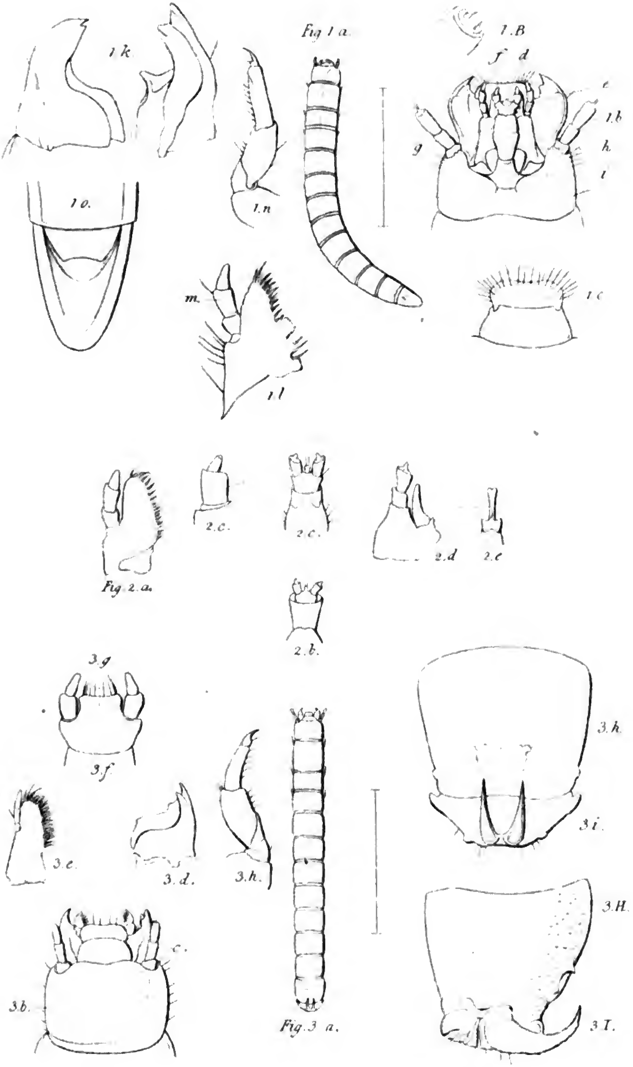
Larva. Plate IV. fig. 2.

Length 9 lines.

This larva so closely resembles the foregoing, both in habits and appearance, that without a minute examination of the trophi I should not have been able to find a distinguishing character. It is, however, destitute of the corneous process on the maxilla; the labium, also, appears very different to that of *Eryx*, but the upper portions of the labium possibly have sunk into the insertio, the larva being dry; though it must be said that the larva of *Eryx* was also dry.

My friend the Rev. A. W. Griesbach found a number of these larvæ in an old oak-tree between Wimbledon Common and Coombe

2 *a*. Maxilla. 2 *b*. Labium, as it appeared in the larva. 2 *c*. The upper parts, pulled out. 2 *d*. Side view of the same, showing the tongue. 2 *e*. Back view of the tongue. 2 C. The labial palpus at large.



G.R. Waterhouse del.

T. Sw[illegible]

Wood, many of which he reared. I am indebted to him for the specimens from which the drawings are made.

HELOPS CŒRULEUS, *Fab.*

Larva. Plate IV. fig. 3.

Yellowish white. Head and tail brown. Body 12-jointed.

Length 10—12 lines.

Head rotundate, smooth. *Antennæ* 4-jointed, the terminal joint minute, within the apex of the third. *Mandibles* short and stout, excavated internally; apex bifid. *Maxilla* elongate; the blade subquadrate, armed internally with spines. *Maxillary palpi* 3-jointed, terminal joint conic; basal short; second moderate and cylindrical. *Labium* elongate. *Ligula* transverse, truncated anteriorly, and furnished with spinous hairs. *Labial palpi* 2-jointed; basal joint robust; terminal conic.

Body elongate, cylindric. *Mesothorax* transverse. *Paratelum* the form of a truncated cone, (the apex joining the telum,) rugose, and having two large irregular foveæ, and two tubercles on the disc. *Telum* corneous, rugose, and armed with two diverging hook-like processes, bending forwards towards the paratelum. The remaining joints of the body equal.

3 *a.* The larva, magnified. 3 *b.* The upper side of the head. 3 *c.* The antenna. 3 *d.* Mandible. 3 *e.* Maxilla. 3 *f.* Labium. 3 *g.* Ligula. 3 *h.* The paratelum. 3 *H.* Side view of the same. 3 *i.* The telum. 3 I. Side view of the same.

I reared several of these larvæ some years back; they are found in the same situations as the larvæ of the genus *Cistela,* and in many respects resemble them.

I believe they are also found in willow-trees.

MYCETOCHARIS SCAPULARIS, *Gyll.*

Larva. Plate V. fig. 3.

Yellowish white. Head ochreous. Body elongate, cylindrical, coriaceous, 12-jointed.

Length 3½—4 lines.

Head smooth, rounded anteriorly, and rather straight at the sides. *Antennæ* 4-jointed, first and second joints short and cylindrical; third joint as long as the two basal, and slightly incrassated towards the apex; terminal minute and slender. *Labrum* transverse, rounded at the sides; the anterior margin slightly undulated, and sparingly furnished with hairs. *Mandibles* divided into two lobes, the external longer, and notched at the apex. *Maxilla* soft and fleshy, elongate, the blade armed with spines internally. *Maxillary palpus* short, 3-jointed, terminal joint truncated at the apex. *Labium* quadrate. *Palpiger* transverse. *Labial palpus* 3-jointed (?) *.

Body elongate, conical, excavated beneath, and furnished with two fleshy prolegs.

3 *a*. Larva, magnified. 3 *b*. Antenna. 3 *c*. Labrum. 3 *d*. Mandible. 3 *e*. Maxilla. 3 *f*. Labium. 3 *g*. Telum. (Newm.) 3 *h*, *h*. Prolegs. 3 *i*. Fore leg.

I have several times found this larva in company with *Mycetocharis*; and this circumstance, with its size and habits, and its resemblance to the larvæ of allied genera, have led me to consider it as the larva of that insect: but I have not yet been able to rear it, and thus remove all doubts.

Found under the bark of oak-trees, where the wood is decayed.

Note.—The anal prolegs in this larva and those allied to it are generally retracted within the abdominal segment whilst the insect is walking forwards, but are used when it is turning or moving backwards.

OPILUS MOLLIS, *Linn.*

Larva. Plate V. fig. 1.

Yellowish white; above of an uniform pink colour. Head and tail pitchy brown. Body 12-jointed.

Length 6—7 lines.

Head corneous, rotundate slightly depressed, rugose. *Antennæ* short, 4-jointed, basal joint robust and short; second rather longer, incrassated towards the apex; third cylindrical; terminal slender, elongate, and with a minute process at the apex †. *Labrum* transverse, elliptical. *Mandibles* short and stout, unidentate internally. *Labium* elongate, quadrilateral. *Palpiger* transverse. *Labial palpi* 2-jointed, basal joint transverse, cylindrical; terminal elongate. *Mentum* elongate. *Maxillæ* short, the blade soft and fleshy, furnished with hairs internally.

Body elongate, dilated in the middle, soft, and covered with long rufescent hairs. *Prothorax* with a triangular coriaceous patch on the disc. *Telum* furnished with two corneous, rugose, diverging protuberances.

1 *a*. Larva, magnified. 1 *b*. Upper side of the head. 1 B. Under side of the head. 1 *c*. Antenna. 1 *d*. Labrum. 1 *e*, E. Mandibles. 1 *f*. Palpiger. (Newm.) 1 *g*. Labium. 1 *h*. Insertio. (Newm.) 1 *i*. Telum. (Newm.) 1 *k*. Fore leg.

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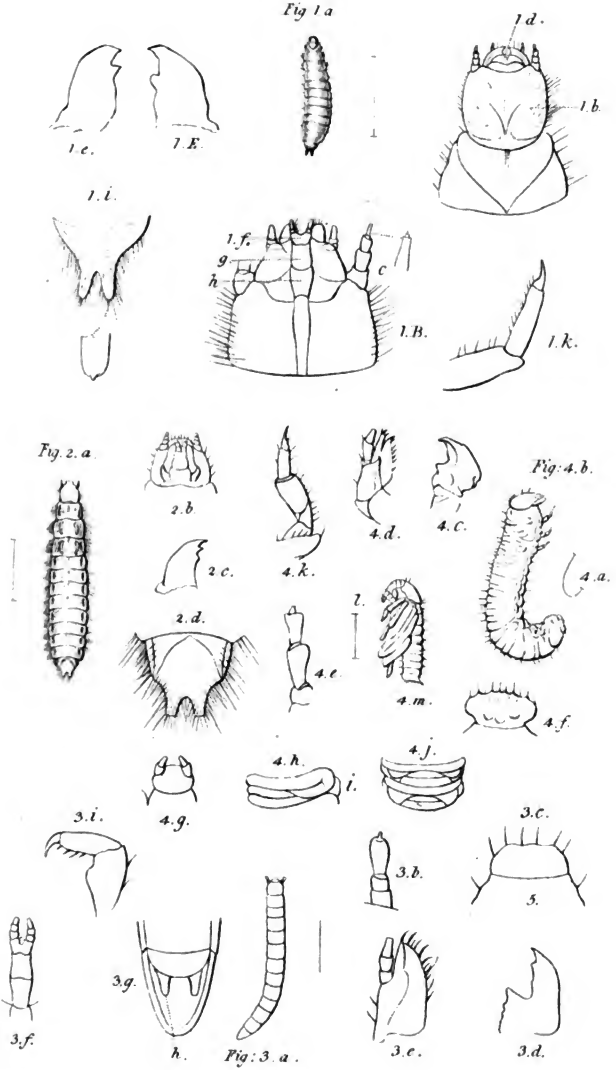
* In separating this part it was injured, so that I am not quite certain whether the base of the palpus is a joint or part of the palpiger.

† This might, perhaps, be considered as a distinct joint, but it is so extremely minute, and consequently so difficult to be seen, that I was induced to describe the antennæ as 4-jointed until I could determine by examining allied larvæ.



G.R. Waterhouse del.^t

J. Swaine sc.

Found during the winter months in the dead wood of oaks and other trees. The specimen from which the accompanying drawing was made was found in the month of December, and although full-grown at the time, remained two years before it assumed the pupa state, from which, however, it soon turned into the perfect insect.

Note.—I have very frequently met with another larva which very closely resembles that here described, but instead of being of an uniform pink colour above, it is spotted with that colour only; possibly it is a a mere variety, but I think it is the larva of *Thanasimus formicarius.*

TELEPHORUS RUFUS, *Müll.*

Larva. Plate III. fig. 3.

Head coriaceous, pitchy black, furnished with two stemmata, one on each side, close to the insertion of the antennæ. Body soft, of a dark brown colour, and very thickly covered with soft fine hairs, giving it the appearance of velvet.

Length 7½ lines.

Head depressed, subquadrate, the basal half covered with a fine pubescence, of the same velvet-like texture as the body; the anterior half smooth. *Antennæ* with the basal joint short; second rather elongate, and containing two small processes partly within the apex. *Maxillæ* soft and fleshy, thickly covered with hairs, especially on the inner side, which is bilobed. *Maxillary palpi* 4-jointed, basal joint short; second moderate and cylindrical; third short and indistinct; terminal slender and acute. *Mandibles* long and acute, unidentate internally.

Body elongate, slightly depressed, the joints nearly equal in width, (taken longitudinally of the insect,) the three first segments each with two impressed foveæ. *Telum* soft and unarmed, but with a fleshy protuberance beneath, which is used as a proleg.

3 *a.* The larva, magnified. 3 *b.* The under side of the head. 3 *c.* The palpiger. (Newm.) 3 *d.* The antenna. 3 *e.* Apex of the same, more highly magnified, showing the two processes. 3 *f.* The mandible. 3 *g.* The maxillæ.

This carnivorous larva is remarkable for having two processes which spring from the second joint of the antennæ instead of a single joint, as is commonly the case in Coleopterous larvæ. It is found during the winter and spring months at the roots of grass and in decayed wood; it assumes the pupa state about the latter end of April, and the perfect insect makes its appearance in May.

ELICOPIS IMPRESSUS, *Marsh.*

Larva. Plate V. fig. 2.

Head, prothorax and telum coriaceous, and of a pitchy brown colour; the former is furnished with two stemmata on each side, near the insertion of the antennæ. Body soft, the colour varying in different individuals, sometimes white, and at others purple, but always thickly covered with brown hairs. The mesothorax and metathorax each with two pitchy black coriaceous patches on each side of the centre.

Length 4½—5 lines.

Head subrotundate, slightly rugose above. *Antennæ* short. *Palpiger* and *labial palpi* very minute, the latter 2-jointed. *Mandibles* short and stout, unidentate internally.

Body elongate, slightly depressed, and furnished with a coriaceous bifid telum.

2 *a.* The larva, magnified. 2 *b.* The under side of the head. 2 *c.* The mandible. 2 *d.* The telum. (Newm.)

This larva is not uncommon during the winter months in the bark of elm-trees; it is evidently very closely allied to that of *Dasytes* and *Opilus*: to the larva of *Telephorus* it also evinces a slight affinity.

QUEDIUS TRISTIS, *Grav.*

Larva and Pupa. Plate III. fig. 2.

Head and prothorax coriaceous, and of a deep pitchy black colour. Mesothorax and metathorax subcoriaceous, yellowish white. Abdomen soft, of a pale brown colour above.

Length 6½—7 lines.

Head subquadrate, depressed. *Antennæ* 4-jointed, the basal joint short; second and third rather elongate; terminal joint slender and acute. *Mandibles* long and acute, simple. *Labrum* transverse, furnished with numerous tubercles. *Labium* minute. *Labial palpi* 3-jointed. *Maxillæ* elongate and slender, furnished with a single lobe internally. *Maxillary palpi* 4-jointed, basal joint short; second and third moderate and nearly equal; terminal acute. *Prothorax* quadrate, rather narrower than the head. *Mesothorax* and *metathorax* transverse, and nearly equal in width to the prothorax; *abdomen* with all the joints equal in length, (taken longitudinally of the insect,) excepting the telum, which is elongate and furnished with two caudal processes, which are rather short.

In the pupa the parts are soldered together; the abdomen is straight; the head and prothorax are suddenly bent forwards, the former touching the body.

2 *a.* The larva, magnified. 2 *b.* The under side of the head, at large. 2 *c.* The mandible. 2 *d.* The maxillæ. 2 *e.* The palpiger. (Newm.) 2 *f.* The labrum. 2 *g.* Antenna. 2 *h.* Telum, showing the caudal processes. 2 *i.* The pupa.

This larva is found in the same situations as the perfect insect; it assumes the pupa state about the latter end of March; the perfect insect appears about the middle of May.

TROX ARENARIUS, *Fab.*

Larva and Pupa. Plate V. fig. 4.

Head pitchy brown. Body of a subtransparent whitish colour, the apical joints bent under, as in the larvæ of the *Geotrupidæ*.

Length 4—4½ lines.

Head round and depressed, scarcely wider than the segments of the abdomen; the fore part is coarsely punctured. *Labrum* minute transverse, armed anteriorly with several very minute tubercles. *Mandibles* short, unidentate internally. *Maxillæ* trilobed, the exterior lobe, or maxillary-palpi 3-jointed; the interior lobe armed with spines on the inner side. *Antennæ* 3-jointed, the terminal joint minute.

Body 12-jointed, and of equal thickness throughout; all the segments (except the prothorax and apical) are subdivided into three; the thoracic joints each furnished with two legs.

4 *a.* The natural size of the larva. 4 *b.* The larva magnified. 4 *c.* The mandible. 4 *d.* The maxilla. 4 *e.* The antennæ. 4 *f.* The labrum. 4 *g.* The palpiger and labial palpi. 4 *h.* One of the central segments of the abdomen, side view. 4 *i.* The under side. 4 *j.* Upper view of two segments. 4 *k.* Fore leg. 4 *l.* The natural size of the pupa. 4 *m.* The pupa magnified.

I have twice met with this larva in company with *Trox arenarius*, and in such situations as rendered it highly probable that it was the larva of that insect; but lately I have had almost positive proofs, my friend Mr. Pickering having found the larva, pupa*, and perfect insect together: the first and last were in great profusion. Hence without my friend's assistance I should not yet have been able to describe this larva. I may add that I am also indebted to him for information respecting several others.

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* It may be remarked that the pupæ of Coleopterous insects so much resemble the imago in the form of the head and thorax, that they cannot be easily mistaken when there is any peculiarity in the form and sculpture of that part, as is the case in our present example.

VII. *Description of a minute Coleopterous Insect, forming the type of a new Subgenus allied to* Tomicus, *with some Observations upon the Affinities of the* Xylophaga. *By* J. O. Westwood, *F.L.S., &c.*

[Read January 6, 1834.]

An instance of the ravages of insects upon the bindings of books having been communicated to me by Mr. Edward Lumley, I have thought that a notice of it might not be uninteresting to the Entomological Society, especially as the insect in question will not well agree with the characters of any established genus. This gentleman gave me the cover of a book [portions of which were exhibited,] which was eaten in every direction by a very minute *Scolytideous* insect, numbers of specimens of which were found dead in the various burrows. This binding seems formed of pasteboard and paste, both of which materials were consumed. Mr. Lumley does not know from what quarter he received the book; and I have nowhere met with a description of the insect, nor observed it in any collection. Entomologists must therefore use their own discretion as to its introduction into our British lists. The following are its characters.

Tomicus (Hypothenemus) eruditus, *Westw.* Piceo-niger, setulosus, thorace fulvo anticè convexo tuberculato, supra caput protenso, antennis pedibusque lutescentibus, elytris posticè rotundatis integris, antennarum clavâ ab articulo 5to incipiente.

Long. corp. lin. ⅘. In mus. nostro.

Pitchy black, the *head* of the same colour, entirely concealed from above by the front of the thorax. The *antennæ* appear to be only 5-jointed, the first joint long and bent at the base, the sesecond large and cup-shaped, the two next very minute yet distinct, the remainder of the antennæ forming a very large ovate mass, somewhat depressed and hairy, in which three rudimental articulations are very indistinctly discernible. The organs of the mouth are formed upon the *Curculionideous* type, and are very similar to those of *Tomicus, Hylurgus,* &c. The *thorax* is fulvous, narrowed in front, and subcucullated (completely concealing the head), with the anterior margin obtusely denticulated, subrugose, and clothed with very short thick pubescence. The *elytra* are oblong, pitchy black and shining, with punctate striæ, a short, thick, pale setula arising from each puncture; they are rounded and entire at the apex. The *legs* are lutescent, the tibiæ compressed, with the external margin towards the apex slightly toothed. The *tarsi* are very interesting in their structure, being *pentamerous*; the first joint is rather indistinct, the two following joints compressed and rather broad, having the underside armed with strong hairs, but in no wise bilobed; the fourth joint is small and rather indistinct, whilst the fifth is long and subclavate, with two simple ungues.

In the formation of the tarsi and other characters, this insect, therefore, more nearly approaches *Tomicus* than the other genera of *Scolytidæ*; but the structure of its antennæ (which is the chief character employed by Latreille to separate the allied genera *Hylurgus*, *Tomicus*, and *Platypus*,) is very different from any of these genera, the clava in *Hylurgus* commencing at the 8th, in *Platypus* at the 6th, and in *Tomicus* at the 7th, whereas in this insect it clearly commences with the 5th joint. The minute size of the insect, moreover, as well as the diversity of colour, distinct habits, and rounded apex of the elytra, induce me to separate it, at least subgenerically, from *Tomicus*, under the name of *Hypothenemus*, derived from ὑπο *subtus*, ἐν, and νεμω *pasco*.

I know of no insects more worthy of minute investigation than these *Xylophaga*, affording as they do an interesting series of affinities, which may materially tend to the discovery of the natural distribution of the Coleoptera. In the three great Linnæan genera *Chrysomela*, *Curculio*, and *Cerambyx*, the tarsi present a perfect uniformity of structure, which has been termed tetramerous; but as they are five-jointed, the fourth joint being very minute and hidden between the lobes of the third, this peculiar formation may be termed subtetramerous. In *Scolytus* and *Hylurgus*, eminently wood-boring insects, the same form of tarsi and cibarian organs exists; these genera, in fact, being *Curculionidæ* without snouts. *Tomicus* is precisely similar in its habits and trophi; but here we find the first departure from the subtetramerous type, the tarsi not being in the least bilobed. A still greater departure, both in the tarsi and trophi, takes place in *Platypus*; but these formations are completely lost in *Bostrichus*, *Apate*, &c. Indeed, so far from placing these latter insects in the same family with the former (as is done by most modern entomologists), I feel great hesitation in thinking them allied by any other tie than that of analogy. It is, however, only by the discovery of the larvæ that we can hope to gain a knowledge of their real affinities.

These circumstances can lead to no other conclusion than that the location generally assigned to the *Xylophaga* between the *Curculionidæ* and *Cerambycidæ* is not a natural one, but that, on the contrary, these insects must immediately precede or follow the great group *Subtetramera*, according as we commence or close the series with such *Curculionidæ* as *Cossonus* and its immediate allies.

PLATE VII.

Fig. 1. *Tomicus* (*Hypothenemus*) *eruditus*, Westw., magnified. 1 *a*. Natural size. 1 *b*. The insect seen sideways. 1 *c*. Antenna. 1 *d*. Mandible. 1 *e*. Maxilla. 1 *f*. Instrumenta labialia. 1 *g*. Tarsus. 1 *h*. Part of the book-binding, showing the ravages of the insects.

VIII. *Remarks on a species of* Calandra, *occurring in the Stones of Tamarinds. By* William Christy, *Jun., Esq., F.L.S., Memb. Ent. Soc., &c.*

[Read February 3, 1834.]

Calandra Tamarindi, *Christy*.

Long. 1¾ lin., lat. ½ lin.

C. picea, oblonga, thorace punctato, elytris nigricantibus.

Rostrum atrum, antennis fulvis. Thorax punctatissimus, in quibusdam speciminibus nigricans. Elytra punctato-striata, basi nigricantia.

Hab. Ind. Occid.?

My attention was drawn to this insect several years since by the circumstance of the stones of a lot of tamarinds almost invariably crumbling to powder in the mouth. Upon examination of some stones which had small holes on the outer surface, I found that the solid alburnum of the seed was perforated in every direction, and the cavities filled with a brownish powder, but I could meet with no insects. I then resolved to examine those stones which were apparently perfect, and immediately on removing the epidermis I was gratified by finding numerous specimens of a small *Calandra* occupying the cavities. They were so abundant, that from one stone, by a careful dissection, I extracted between thirty and forty specimens. In one or two instances I met with the larva and pupa. I need hardly add that the insects in all stages were dead, having, in the preservation of the tamarinds, been exposed to a boiling heat.

It seems evident, from my having found both larva and pupa in the stones, that they, and not the fruit generally, are the proper food

Fig 1

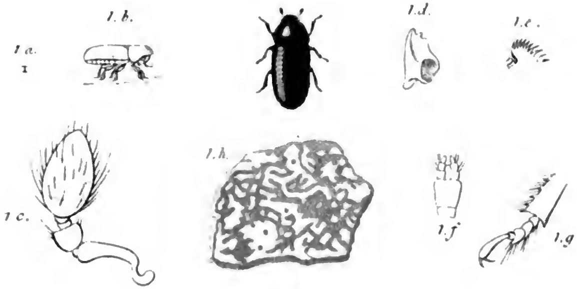
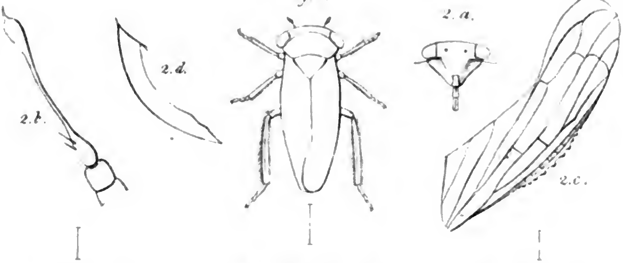


Fig 2.



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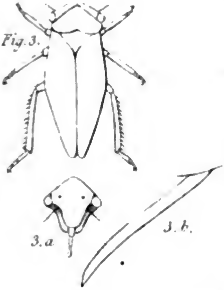

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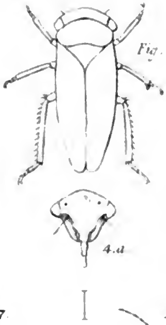


Fig. 5

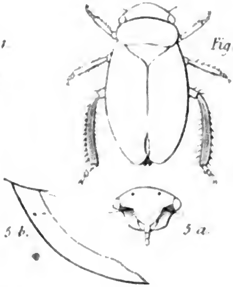
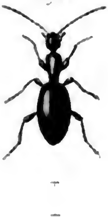


Fig. 8



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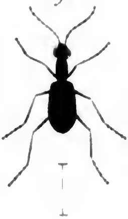

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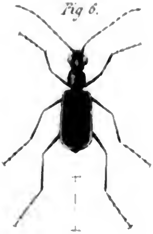
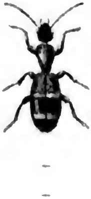


Fig. 9.



and habitation of the insect. Those stones in which I found them exhibited no traces of puncture in the epidermis, while those which appeared so were almost universally destitute of inhabitants, showing that any external openings were caused by the departure of the insect. It would be curious to ascertain in what manner the parent insect deposits her eggs. If she attacks the fruit in an advanced state, she must have to make her way through the external shell, the intensely acid pulp, and the leathery envelope of the seeds, before arriving at the stone itself. Can it be that she deposits them in the fruit when very young, or in the germen when in flower? But these questions can only be answered by some one resident on the spot, who can examine the fruit in its various stages of growth. Perhaps some "Rusticus" in Jamaica or Barbadoes may at some future time give us information on this subject.

I have ventured to describe this insect as new, at the instigation of the Rev. F.W. Hope, to whose valuable assistance I am much indebted. It does not exist in the rich collection of that gentleman, nor can I find any figure or description of it in any work. Its place in the genus is evidently near *C. Oryzæ*, as I am indebted to my friend Mr. Curtis for pointing out to me on my first discovering this insect.

From the variation in colour in this species, all, however, more or less tending to black, I am inclined to agree with the opinion expressed by Mr. Hope, that in its mature state black is its proper colour.

All the specimens which have come under my notice appear to have only recently undergone their last metamorphosis, and therefore may be supposed to be paler in colour than when in a state of maturity. With regard to its habitat, I desire to speak cautiously, but I believe it to be the West Indies. I have been at some pains to trace the history of the lot of tamarinds in which alone I have found the insect, but without a certain result. There appears, however, much reason to believe that they were brought from one of the West India islands.

I must apologise for offering to the Society so uninteresting and meagre a detail; but believing that any notice of a new insect would be acceptable, I have ventured to present this paper.

IX. *Description of the Nest of a gregarious species of Butterfly from Mexico.* *By* J. O. Westwood, *F.L.S., &c.*

[Read February 3, 1834.]

I beg leave to offer to the notice of the Entomological Society a remarkable example of instinctive economy afforded by the nest of a gregarious species of Butterfly from Mexico, for an opportunity of examining and describing which, I am indebted to Owen Rees, Esq., of Paternoster Row.

The nest of this insect, which I have figured in Plate VI., is of firm texture, not much unlike very thick parchment, which it also resembles in colour. It is about eight inches long, of a somewhat oval form, narrowed at the top for about three inches into a kind of neck, and attached to a slender branch, without the power of swinging backwards and forwards, in consequence of being built at the junction of a twig which runs down the neck of the nest. The lower part of the nest is a little produced, and is terminated by a circular orifice about two thirds of an inch in diameter.

On examining the texture of the nest with a very high-powered lens, it is found to be composed of an infinity of shining and very slender silken lines crossing each other in every direction: from the strength of its texture, therefore, the labour employed in its construction must be very great. On the whole, this nest has much the appearance of some of the Paper-making Wasps' nests, such as *Vespa chartaria*.

On making a longitudinal incision from the bottom of the nest a remarkable appearance presented itself, not fewer than a hundred chrysalides being attached both to its inner surface, occupying the upper half of the dome of the nest, and to the lower part of the twig descending through its neck.

The nest is therefore the pendent habitation of the social caterpillars of a species of butterfly, and is, in fact, the most perfectly formed nest of any Lepidopterous insect yet described. It appears to be a specimen of the nests mentioned by Mr. Hardy in his 'Travels in the Interior of Mexico,' lately published (p. 32.). This author, however, neither describes the caterpillar, nor notices the species of butterfly whose constructions excited his observations. He says: "After having ascended for about an hour we came to the region of oaks and other majestically tall trees, the names of which I could not learn. Suspended from their stately branches were innu-

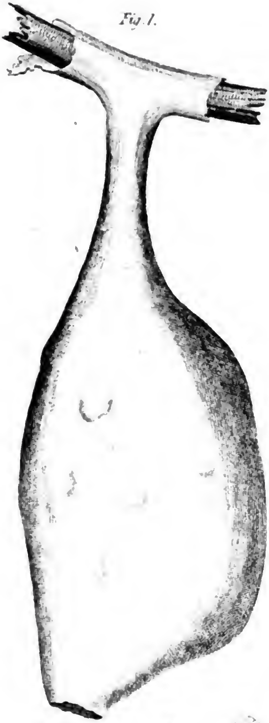


Fig. 1.

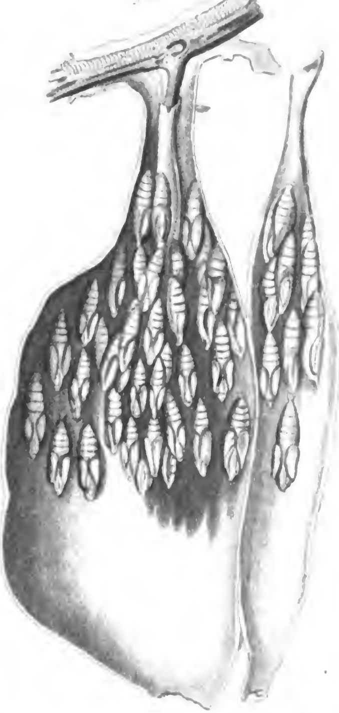


Fig. 2

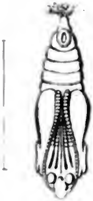


Fig. 4.

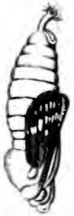


Fig. 3

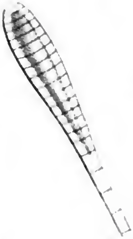


Fig. 5.

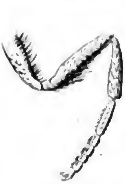


Fig. 9.

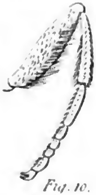
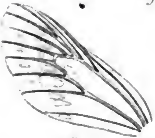


Fig. 10.



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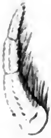

Fig 6.

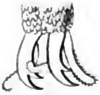

Fig. 11.

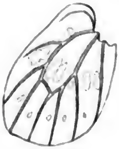

Fig. 8.

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merable nests, inclosed apparently in white paper bags, in the manner of bunches of grapes in England to preserve them from birds and flies. I had the curiosity to examine one of these, which I found to contain numberless caterpillars. The texture is so strong that it is not easily torn, and the interior contained a quantity of green leaves to support the numerous progeny within." Respecting this statement, it is however to be observed, that the white paper bag did not, in the specimen under examination, inclose, but on the contrary formed the nest itself. Moreover, when we consider the "numberless caterpillars" which one of these nests must contain, and their amazing voracity, it will be at once perceived that the few leaves attached to the sprig inclosed within the nest cannot be sufficient support for the numerous progeny within, but that on the contrary each of them must be under the necessity of making constant excursions for the purpose of feeding. And when we further consider that from the firmness of the texture of the nest it has in all probability formed the habitation of the entire brood from the time of their first exclusion from the egg, instead of being abandoned and a fresh nest formed in a more commodious situation, for the supply of the inhabitants when the immediately adjacent stock of food has been consumed, (as is the case with those social caterpillars which merely form slight webs for their habitations,) the instinctive knowledge of the caterpillars becomes evident, as, by the time that they are full-fed, they must be under the necessity of travelling to a considerable distance from their habitation for fresh food; and were it not for this faculty they would not be able to retrace their steps to the nests. Reaumur, indeed, asserts that the larvæ of ***Eriogaster lanestris***, which live in society, pave their passages with silk, in order to render them more easy for the insects to walk upon; but in the 'Insect Architecture' it is more broadly stated that "no individual in these communities moves an inch without constructing such a pathway both for the use of his companions and to facilitate his own return." As, however, this idea is clearly generalized from Reaumur, and as the insect instanced by the latter is eminently a silk-weaving insect, it is not improbable that in other instances (especially as in the present,) where the larvæ are not general spinners, the return of the larva to the nest is effected by the possession of the same instinct as that which directs the bee when at a surprising distance to her hive, and which appears to me to result neither from extensive powers of vision, as some authors have endeavoured to prove, nor from the operation of memory, as supposed by Rogers in his 'Pleasures of Memory'*.

---

* Hark! the bee winds her small but mellow horn,
Blithe to salute the sunny smile of morn; O'er

Another interesting inquiry arises as to the manner in which this nest is enlarged from time to time by its inhabitants, as its general form and appearance do not exhibit any trace of additions*.

This principle of sociality has been ascertained to exist in very few other species of butterflies; examples of it occurring in the *Vanessa Urticæ* and *V. Iö* upon nettles, and also in *Melitæa Cinxia* upon the plantain—but their nests are of the slightest texture.

The inclosed chrysalides were suspended by the tail, no girth being fastened around their bodies as in the white butterflies. In this respect, therefore, they resemble the *Vanessæ*; but the chrysalides have no angular projections.

Description of the Pupæ.—They are about four fifths of an inch long, and of a reddish brown uniform colour. The anal extremity is terminated by a flattened slightly bent plate, armed at the point by numerous short bent spines, by which it is attached to the little bundle of silk spun by the larva for its attachment. Beneath this appears a nearly rounded raised plate, with a line in the centre, which seems to cover the anus of the imago. The abdominal segments are rounded at the lateral margins, and gradually become narrower to the tail. A slight keel runs along the ridge of the back of the mesothorax, which is very convex. The head is terminated by an obtuse point. The base of each of the upper wings is also a little bulged out, forming an obtuse angle.

The antennæ are laid along the margin of the wings: next to the antennæ are placed the middle legs, then the anterior legs, and in the middle the two divisions of the maxillæ, which reach as far as the extremity of the legs.

On dissecting several specimens of these chrysalides which were ready to assume the imago state, I found no difficulty in raising these parts from the body of the chrysalis, *each on its distinct sheath*†. I

O'er thymy downs she bends her busy course,
And many a stream allures her to its source.
'T is noon, 't is night. *That Eye* so finely wrought,
Beyond the search of sense, the soar of thought,
Now vainly asks the scenes she left behind,
Its orb so full, its vision so confined :—
Who guides the patient pilgrim to her cell ?
Who bids her soul with conscious triumph swell ?
Hail, Memory ! hail ! thy universal reign
Guards the least link of being's glorious chain.

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* In the *Bombyx processionea* the larvæ do not unite in forming a general habitation until they have attained two thirds of their growth; their nests, therefore, will not need enlarging like those which live in society from their birth. The Mexican butterfly may possess similar habits, which will account for the non-appearance of additions to the nest.

† See Kirby and Spence, vol. iii. p. 245. to the contrary.

also discovered that the palpi were laid along the breast immediately beneath the base of the maxillæ. I was much perplexed at first in not discovering the third pair of legs, and as I could only meet with two pair in the first two or three specimens which I dissected, I concluded that these were the only legs the insect possessed, and that the other, or, as I supposed, anterior pair, (which in the *Vanessæ*, &c., are rudimental,) had here become totally obsolete. Subsequently, however, by examining the place of insertion of the legs, I found that a third posterior pair existed, but that in the pupa state they were laid under the lower pair of wings.

In these chrysalides I also observed the lunate lævigated piece on the inner side of the eyes, which Messrs. Kirby and Spence consider may perhaps transmit some light to the inclosed butterfly.

It is here to be observed that the lower part of the interior of the nest was stained with a fluid similar to that emitted by newly hatched specimens of our English *Vanessæ*, which has in certain seasons been regarded as bloody rain. Moreover, it is evident that, as in the case of the Pomegranate Butterfly*, the imago as soon as hatched must quit the nest before its wings are expanded, otherwise it would be unable to make its exit through the small orifice at the bottom of the nest.

My next object was to ascertain the structure of the butterfly inclosed in these chrysalides, and after much labour I discovered that the upper wings are entire, with a transverse nerve closing the large elongated discoidal cell. They are of a dark brown colour, with a row of irregular-sized cream-coloured spots at about one third of the distance from the outer margin of the wing, and with three or four very slender short lines between the latter and the margin. The lower wings are oval and entire, with the outer posterior angle rather acute; they are also dark brown, with a central row of irregular cream-coloured spots, and another submarginal row of a much smaller size: the large discoidal basal cell is also closed by a transverse nerve. I have carefully figured the nervures occupying the exterior angle of the upper wings, as this character appears of much importance in the very difficult classification of the Lepidoptera.

These wings, as they lay within the pupa-skin, exhibited all their markings, of course of a reduced size, as represented in fig. 3. The wings themselves appeared perfectly flat; and it was difficult to conceive how these organs could expand to their full dimensions, all the spots preserving their relative sizes. The difficulty was, however, removed on denuding the wings of their scales, when their surface was discovered to be entirely covered with an innumerable series of minute wrinkles, giving the wing an elasticity which enabled me to stretch them to nearly double their size on moistening them with water: they immediately, however, returned to their former size on withdrawing the hand. If we imagine the scales to be placed upon the upper edge of each ridge, and that they increase in size as the wings expand, we shall be furnished with a further clue to the solution of the interesting question of the mode of the expansion of the wings in this interesting order of insects.

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* The history of this butterfly will form the subject of a memoir to appear in the next Part of these Transactions.

The antennæ were found to terminate in a gradually elongated club, which from the dried state of the specimens had sunk on one side as represented in my figure.

The palpi are rather longer than the head, distinctly three-jointed, the third joint being as long as, but slenderer than the second joint.

From the interesting discoveries of Dr. Horsfield, the structure of the legs however proved of the highest interest, the anterior pair being eminently perfect, the coxæ nearly as long as, and the tibiæ shorter than the femora. The tarsi in the fore legs of all the specimens which I examined were rather longer than the femora, distinctly five-jointed, with a large fleshy pulvillus, a pair of strong bifid claws, and a pair of elongated membranous appendages. The middle legs were rather larger, of a precisely similar structure, except that the coxæ were not free but united to the mesosternum, whence this pair of legs cannot possess such extensive powers of locomotion as the anterior legs. The hind legs were also similar, but somewhat shorter and more slender.

The body in a mutilated specimen which had arrived at the imago state, but was unable to escape from the nest, was about ¾ inch long, and an upper wing which I also found in a mutilated state was about 1¼ inch from the base to the extremity, whence we may calculate the expanse of the wings at about 2½ inches.

This butterfly, however, is equally interesting in another point of view. Respecting its situation in the series of diurnal Lepidoptera, it is to be observed, that from the mode of suspension of the chrysalis and its smooth exterior, united to the structure of the butterfly, and especially that of the fore legs, it will neither enter into any of the present genera, nor even into any of the great divisions established amongst butterflies.

Latreille, in the new edition of the 'Règne Animal' (tom. v. p. 375), lays it down as a rule that those butterflies which have the chrysalides suspended vertically, and simply attached by the extremity of the body, "sont constamment tétrapodes." The insect in question affords a striking contradiction to this rule*.

The form of the pupa excludes it from the two typical families *Nymphalidæ* and *Papilionidæ*, as characterized by Mr. Swainson in the Philosophical Magazine for March 1827; whilst the mode of suspension and structure of the legs conjointly remove it from his three aberrant families *Hesperiidæ, Polyommatidæ* and *Heliconiidæ*. From the *Hesperiidæ, Nymphalidæ* and *Lycænidæ*, as characterized by Mr. Stephens†, the structure of the fore legs and antennæ remove it; but it would fall into his remaining family *Papilionidæ*, except that the pupa is not girted across the body.

On referring, however, to the valuable remarks contained in the most scientific work hitherto published upon the Lepidoptera, I mean Dr. Horsfield's 'Lepidoptera Javanica,' we gain a clue to its real situation, which, however, appears to me to disturb the series of transitions proposed in that work. This situation I consider to be osculant between the stirps typified by *Papilio* (*Chilognathomorpha*, Horsf., also containing the genera *Pieris, Pontia*, &c.) and the *Thysanuriform* stirps of Dr. Horsfield, containing *Hipparchia*, &c.

In some respects this genus might be regarded as osculant between the *Chilognathiform* and *Chilopodiform* stirpes of Dr. Horsfield, but this author has satisfactorily shown that this situation is occupied by the genera *Euplœa, Idea, Acræa*, and *Heliconia*.

On the other hand, in the mode of suspension, the nearly smooth chrysalis, and the tarsal appendages, it seems to approach the *Hipparchiidæ*, whilst the obtuse head of the chrysalis, perfect anterior legs, and the form of the palpi, as well as the tarsal apparatus, show an equal affinity with such of the *Papilionidæ* as approximate towards *Pieris, Pontia*, &c.

From these observations, the necessity will be at once perceived of establishing a distinct genus for the reception of this insect, and which may be named, from the perfect structure of the fore tarsi,

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* It is a circumstance of much singularity, and one which appears not easily reconcileable with our ideas of the instincts of animals, that those butterflies which in the perfect state are furnished with six perfect legs, attach themselves, on assuming the pupa state, in such a position that on arriving at the perfect state they will have occasion only to burst their fetters and creep at once along the surface upon which they have been affixed; whilst those butterflies which have the fore legs rudimental, and apparently incapable of rendering any assistance, suspend themselves by the tail in such a position that they must necessarily come into the perfect state head downwards, and have to ascend the outside of the fragile pupa-case, with the assistance of their four hind legs, before they can obtain a sure footing on the twig or leaf from which they have been suspended.

† Illust. Brit. Ent., *Haustell.*, vol. i. p. 5.

EUCHEIRA, *Westw.*

Palpi capitis longitudine articulis 3, duobus ultimis subæqualibus.

Antennæ capitulo elongato sensim incrassato.

Pedes antici insigniter perfecti, coxis valde elongatis, tarsis elongatis 5-articulatis. Tarsi pedum omnium unguibus elongatis bifidis pulvillo magno centrali appendiculisque duobus lateralibus membranaceis instructi.

Alæ anticæ integræ; *posticæ* rotundatæ, angulo postico paulo producto, cellulâ postice clausâ.

Larvæ——? nidi subpapyracei communis incolæ.

Pupæ caudâ tantum suspensæ, capite obtuso, tuberculis destitutæ.

Genus osculans Hipparchiidas cum Papilionidis conjungens*.

Sufficient information is also afforded by the specimens extracted from the chrysalides to enable me to give the following specific character.

EUCHEIRA SOCIALIS, *Westw.*

Alis nigro-fuscis, anticis maculâ parvâ albidâ versus apicem cellulæ discoidalis, serie macularum (magnitudine irregulari) pone alæ medium et cum margine postico parallelâ, serieque alterâ macularum 4 parvarum, elongatarum, submarginalium, albidarum; posticis serie centrali macularum irregularium alterâque serie punctorum submarginalium albidarum.

Expansio alar. circ. 2¼ lin.

Habitat in Mexico.

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* I do not adopt Dr. Horsfield's terms for the stirpes of the Butterflies, *Anoplurimorpha*, &c., since the same system of names is applied to them as *secondary* divisions of an order, as that established by Mr. MacLeay (upon similar analogical considerations) for the *primary* divisions of the Coleoptera. Moreover, Dr. Horsfield's groups seem quite equivalent to the groups, to which, in adoption of Mr. Kirby's admirable views, the family termination in *idæ* is affixed.

PLATE VI.

Fig. 1. The nest described in the preceding memoir, represented one half of the natural length.

Fig. 2. The same opened, showing a portion only of the pupæ.

Fig. 3. A pupa nearly arrived at the perfect state, with the wing-case scaled off, seen sideways.

Fig. 4. Ditto, seen from the front.

Fig. 5. An antenna stripped of its case.

Fig. 6. A labial palpus, ditto.

Fig. 7. An upper wing, ditto.

Fig. 8. A lower wing, ditto.

Fig. 9. A fore leg, ditto.

Fig. 10. A hind leg, ditto.

Fig. 11. The claws and pulvilli more strongly magnified.

X. *Descriptions of several Species of Australian* Phasmata. *By* GEORGE ROBERT GRAY, *Esq., M.E.S. France and London.*

[Read February 3, 1834.]

IN my published Monograph of the Australian species of the genus *Phasma*, I have described sixteen species, thirteen of which are for the first time noticed; since its publication several new species have reached me, and I am induced to lay them before the Society for the purpose of extending the monograph.

The species to which I first wish to call your attention belong to the second section formed by me under the denomination of *Diura*.

5*.[1] PHASMA (DIURA) GOLIATH.

Viride, mesothorace scabriusculo; alis hyalinis, glaucis; areâ costali tegminibusque supra viridibus, maculis lineisque rubro-albis, subtus sanguineis; foliolis brevibus in medio carinatis.

Long. corp. 8 unc. 6 lin. Exp. alar. 8 unc. (Anten. mutilatis.)

In size it approaches *Ph. Titan*, but differs in having much longer and broader wings than are usual in this section, which, when closely applied, cover two thirds of the abdomen. The leaflets are rather short, keeled down their length so as to form a V reversed. The colour of the head and prothorax is pinkish white; that of the mesothorax is yellow, with a bluish green line along the centre. The abdomen is green, with the joints yellow, and margined on each side with black. The fore legs are rather short; the two posterior pairs are of moderate length, and strongly spined on their inner margin, the spines being somewhat depressed.

The specimen from which the above description is taken is in the collection of New Holland insects belonging to Mrs. Dunn, who is uncertain from what part of the country it was obtained. Mr. John Curtis also possesses a specimen; but both individuals have lost their antennæ.

6*. PHASMA (DIURA) BRIAREUS.

Brunneum, mesothorace vix scabro; foliolis brevissimis, latis; pedibus brevioribus, posticis quatuor spinosis.

Long. corp. 5 unc. 9 lin. Exp. alar. 2 unc. 5 lin.

This insect is allied in several respects to *Ph. Chronus*. The description is taken from a female, the other sex at present being unknown. In size it is less, and the legs are shorter in proportion than in *Ph. Chronus*, added to which the totally different form of the leaflets gives it a distinctive character.

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[1] These numbers refer to the corresponding ones in my Monograph of the Australian species of this genus.

The specimen is described from Mrs. Dunn's collection, who received it with *Ph. Goliath*.

From the knowledge I have obtained of the differences which the insects of this extensive family undergo in their progress to maturity, I am induced to describe the two following insects as distinct, although neither of them has advanced to its perfect state.

7*. PHASMA (DIURA) OSIRIS.

Pallide brunneum, mesothorace scaberrimo; foliolis brevissimis, trigonis; pedibus (anticis mutilatis) intermediis et posticis brevibus, lineis elevatis striatis, tibiarum apice et basi parum dilatatis.

Long. corp. 4 unc. 6 lin.

The peculiar form of the leaflets, which are trigonal, at once distinguishes this species from those previously described. The specimen belongs to the Rev. F. W. Hope, who states that it was brought from Melville Island.

7**. PHASMA (DIURA) ACHERON.

Albidum brunneo admixtum, thorace subglabro; foliolis longis, sublatis; pedibus brevioribus, anticis foliato-compressis, intermediis et posticis paulum incrassatis, his spinosis, tibiis interne spinis latis duabus in medio armatis; tarsorum articulo primo erecto dilatato.

Long. corp. 4 unc. 8 lin.

The anterior legs having a compressed foliation along their outer margin, and the tarsi being compressed above, sufficiently characterize this species. It is contained in Mrs. Dunn's collection, who received it with the *Ph. Goliath*.

The fifth species which I shall here describe belongs to the Apterous division, and is supposed to form part of the Latreillian subgenus *Bacteria*, its position being at present doubtful on account of the antennæ of both specimens being imperfect.

12*. PHASMA (BACTERIA ?) SPINOSUM.

Thorace, abdominis articulo primo pedibusque fortiter spinosis;

♂ filiforme, flavescenti-brunneum, lineâ in medio nigrâ.

Long. antennarum corporisque ob fracturas partium ignota.

♀ cylindricum albidum, lineâ in medio æneâ.

Long. corp. 4 unc. 3 lin.

This species was received from Swan River by the Rev. Frederick William Hope, who kindly lent me the specimens now exhibited.

XI. *Descriptions of some new Genera of British* Homoptera. *By* R. H. LEWIS, *Esq., M.E.S.*

[Read February 3, 1834.]

IDIOCERUS[*]. Plate VII. fig. 2.

CAPUT thorace latius; vertex perbrevis arcuatus medio brevissimus. Facies subturbinata. Oculi magni. Ocelli 2 in facie, inter oculos dispositi. Antennæ triarticulatæ, in facie inter oculorum marginem inferiorem insertæ; articulus primus brevissimus, secundus cylindricus, ultimus setiformis, in mare apicem versus in clavam subovatam compressam dilatatus. Prothorax transversus, subovatus, posticè excisus. Scutellum magnum, trigonum. Alæ superiores corpore multo longiores, apice sese involventes. Tibiæ posticæ valdè spinosæ et ciliatæ.

Head broader than the thorax; the *vertex* very short, with the anterior margin slightly convex, the posterior very concave. *Face* subturbinate. *Eyes* very large. *Ocelli* 2, placed in the face between the eyes, to which they are a little closer than to each other. (Fig. 2, *a.*) *Antennæ* inserted in slight depressions or excavations between the inferior margin of the eyes; the first joint very short, the second short, cylindric, the last long, setiform, with two lateral bristles near the base; *in the male*, towards the apex, dilated into a nearly oval, much compressed club, with the apex very slender. (Fig. 2, *b.*)[†] *Rostrum* about as long as the prothorax. *Prothorax* transverse, ovate, posteriorly excised. *Scutellum* large, trigonate. *Superior wings* much longer than the abdomen, of a membranaceous texture; their extremities dilated internally, and one covering the other; the nervures completed, without extending far into the internal dilated portion, leaving there a margin of pure membrane. (Fig. 2, *c.*) *Ovipositor* short, slightly curved upwards. (Fig. 2, *d.*) *Anterior* and *intermediate tibiæ* very short; the anterior internally, densely, and finely ciliated; the intermediate internally, with a few fine ciliæ. *Posterior tibiæ* long, slightly curved, somewhat prismatical; externally, with the superior margin densely clothed with spinulæ; the inferior margin with seven or eight spines, gradually increasing in size from the base of the tibia to the apex; internally, with a scanty row of spinulæ, directed downwards, and a very dense row of fine cilia, directed inwards; the apex surrounded with small spines. *Tarsi* triarticulate; the anterior with the terminal joints, and the posterior with the basal joints longest.

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[*] *ἰδιος peculiaris, κερας cornu.*

[†] I have stated the antennæ to be three-jointed; I think it not improbable, however, that the base of the seta, which bears the lateral bristles, may be a distinct joint.

Allied to *Agallia*, Curt., *Bythoscopus*, Germ.[*], &c.; but the form of the head and apex of the anterior pair of wings will readily distinguish it from these. The very remarkable form of antennæ of the male does not, I believe, exist in any other Homopterous genus, nor have I found it noticed by any author. In addition to this, the males of some species possess another peculiarity: the costa is in the middle incrassated and obtusely dentate (fig. 1, *c*.); in others it is simply incrassated, and in others simple. As far as I have been able to ascertain, all the species are inhabitants of various species of willows. Their wings are for the most part beautifully iridescent.

Sp. 1. Id. stigmaticalis. *Sub-fuscus*, mas, *maculá stigmaticali ochreá*; fœm. *capite sub-ochreo, maculá obcordatá nigricante medio frontis, maculáque trigonatá distinctá prope oculos nigrá.*

Long. corp. 2¼ lin. Exp. alar. 6 lin.

Male. Beneath pale ochreous. Head, particularly the face, bright ochreous; the forehead with a semicordate dusky mark, on each side with a small black excavation. Thorax posteriorly greyish brown variegated with fuscous, anteriorly pale ochreous with black spots. Scutellum pale ochreous; on each side at the base with a black trigonate spot; in the middle with a black fork-shaped mark, having on each side a fine black dot. Superior wings semitransparent; the place of the stigma with a brilliant ochreous spot; the costa obtusely dentated, at the base ochreous, in the middle black; the nervures dark fuscous; in the middle of the wing very dark, with fuscous diffused over the wing, forming, as it were, an oblique fascia; beyond which are three white nervures, forming an oblique hyaline fascia; the sutural margin dark fuscous. Inferior wings hyaline, with black nervures. Abdomen above black, with a slender pale margin to each segment. Tibiæ externally with black lines.

Female. Beneath dirty cream colour. Head very pale ochreous; the forehead in the centre with a large obcordate blackish mark, on

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[*] Vide a paper of Professor Germar's in Silbermann's 'Revue Entomologique.' *Jassus lanio*, Fab., is the type.

each side with a small black excavation and a very distinct trigonate black or fuscous spot near the eyes. Prothorax posteriorly greyish brown, variegated with fuscous; anteriorly pale ochreous, with black spots. Scutellum pale ochreous; at the base on each side with a black trigonate mark; in the middle with a black, lanceolate, abbreviated line, the forked part being obsolete, having on each side a fine black dot. Superior wings semitransparent; the nervures pale brown, at the apex darker; the costa in the middle and the sutural margin variegated with dark fuscous. Inferior wings hyaline, with black nervures. Abdomen above black, with a slender pale margin to each segment. Intermediate and posterior tibiæ at the base with a black spot.

Willows, Battersea. August.

The male may be at once distinguished from all other British species by its yellow stigmatical spot. The female may be known by its more distinctly maculated head and thorax. I have deposited a specimen of the female in the Museum of this Society.

MACROPSIS*. Plate VII. fig. 3 and 4.

Caput latitudine thoracis; vertex perbrevis, arcuatus. Facies subrhomboidea, apice truncata. Oculi mediocres. Ocelli 2 *in facie inter oculos dispositi. Antennæ triarticulatæ in excavatione infra oculos insertæ; articulus primus brevissimus, secundus cylindricus, ultimus setiformis, longitudine prothoracis. Prothorax transversus, subovatus, posticè excisus. Scutellum trigonum. Alæ superiores vel semicoriaceæ vel membranaceæ, abdomine longiores. Oviductus ferè rectus. Tibiæ posticæ valdè spinosæ et ciliatæ.*

Head as wide as, or a little wider than the thorax; the anterior margin convex, the posterior concave. *Face* subrhomboidal, with the apex truncate. (Fig. 3, *b*. and fig. 4, *b*.) *Eyes* moderate. *Ocelli* 2, small, placed in the face between the eyes, to which they are closer than to one another. *Antennæ* placed in excavations at the side of the face beneath the eyes, having a lateral direction and stretching downwards; the two first joints very short, cylindrical; the terminal one a stoutish seta, about the length of the prothorax. *Rostrum* as long as the prothorax. *Prothorax* transverse, subovate, posteriorly excised. *Superior wings* much deflexed, longer than the abdomen, and either of a semicoriaceous or membranaceous texture. *Inferior wings* ample. *Ovipositor* long, nearly straight, or slightly curved downwards. (Fig. 3, *c*.) *Ante-*

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* *μακρος longus, ὀψ oculus.*

rior and *intermediate tibiæ* apparently without spurs, though when viewed under a good magnifier, having their internal margin clothed with a series of short fine ciliæ, the intermediate tibiæ being less ciliated than the anterior. *Posterior tibiæ* but slightly curved, somewhat prismatical; externally, with the superior margin clothed with fine spinulæ, the inferior margin with eight or nine spines of nearly equal size, or stouter in the middle of the tibia; internally, with a scanty series of spinulæ directed downwards, and a dense row of ciliæ directed inwards; the apex surrounded with small spines. *Tarsi* narrow, triarticulate; the anterior and intermediate with the terminal, and the posterior with the basal joints longest.

Allied to *Agallia*, Curt., from which, however, it may be readily distinguished by the antennæ. In that genus they are inserted in the face between the inferior margin of the eyes; the two first joints very distinct and not concealed, the last a fine seta, as long as, or longer than the head, prothorax, and scutellum taken together: in this the two first joints are very short, and almost concealed in the excavation, the last joint the length only of the prothorax. From *Bythoscopus*, Germ., the length of the face and shape of the ovipositor, which in that genus is short and much curved upwards, will at once distinguish it.

In some species the superior wings are semi-coriaceous, in others with some portion hyaline, and in others wholly membranaceous. This genus will, however, be more correctly divided, from the form of the head and thorax, as follows:

A. (Fig. 3.) *Facies plana*; (Fig. 3, *b*.) *Prothorax transversus, obcordatus.*

Sp. 1. *M. virescens*, Fab. Flavo-viridis.

Long. corp. 2¼ lin., lat. corp. 1 lin.

Cicada virescens. *Fab., Ent. Syst.* 4. 46. 84. *Syst. Rhyng.* 79.

Yellowish green; superior wings semicoriaceous, subhyaline, the nervures towards the apex whitish green; inferior wings hyaline, with white nervures; apex of the outer sheaths of the ovipositor orange; the ovipositor castaneous.

Willows, Battersea, Coombe. July, August.

I have deposited a specimen in the Museum of this Society.

B. (Fig. 4.) *Facies disco tumido*; (Fig. 4, *b*.) *Prothorax transversus, ovatus, posticè excisus.*

Sp. 2. *M. flavicollis*, Linn. Fusco-ferrugineus, capite thoraceque viridi-flavis.

Long. corp. 2¼ lin., lat. corp. 1 lin.

Cicada flavicollis. *Linn., Syst. Nat.* 709. *Faun. Suec.* 891. *Schæff. Icon.*

A very variable species, sometimes ferruginous, with the head, thorax, and scutellum greenish yellow; sometimes entirely ferruginous; the superior wings generally with large diaphanous spots.

Common near London, at Birch and Coombe Woods. July.

There are many other varieties, but it seems unnecessary for me now to describe them. Fabricius's *Cicada flavicollis* seems distinct, as are probably some of Schæffer's varieties. The unicolorous varieties resemble some species of the first division; the sectional character must therefore be attended to. I have deposited a nearly typical specimen in the Museum of this Society.

BATRACOMORPHUS[*]. Fig. 5.

Corpus depressum. Caput thorace vix angustius; vertex lunatus. Facies transversa, subovata. Oculi minimi. Ocelli 2 *in faciei margine superiori dispositi. Antennæ in excavatione inter oculorum marginem inferiorem insertæ; articulus primus brevissimus, secundus cylindricus, ultimus setiformis. Prothorax transversus, subovatus, posticè excisus. Scutellum magnum, subtrigonum. Alæ superiores longitudine abdominis. Oviductus falcatus* (fig. 5, *b*). *Tibiæ intermediæ internè et externè paucis spinulis; posticæ externè bifariam spinosæ, internè spinulosæ et ciliatæ.*

Body depressed. *Head* nearly as wide as the thorax, the anterior margin very convex, the posterior slightly concave, forming a lunate or crescent-shaped vertex. *Eyes* small. *Ocelli* 2, placed near the superior margin of the face. (Fig. 5 *a*.) *Face* transverse, subovate. *Antennæ* inserted in large excavations in the face between the inferior margin of the eyes, short, triarticulate; the first and second joints very short, cylindrical, the last a short stout seta. *Rostrum* rather shorter than the prothorax. *Prothorax* transverse, ovate, posteriorly gently excised. *Scutellum* large, broad, trigonate. *Superior wings* slightly deflexed; the apex of the suture with small overlapping projections. *Inferior wings* ample. *Ovipositor* much curved upwards. *Anterior tibiæ* internally densely ciliated. *Intermediate tibiæ* both externally and internally with a few small spines. *Posterior tibiæ* curved, compressed; externally with two rows of strong spines; internally with a row of spinulæ directed downwards, and a series of ciliæ directed inwards. *Tarsi* triarticulate; the anterior and intermediate with the terminal, and the posterior with the basal joints longest.

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[*] *βατραχος rana, μορφη forma.*

This genus partakes of the characters of two groups: by its depressed form, lunate vertex, and slightly spiny intermediate tibiæ it approaches that to which Professor Germar has restricted the name of *Iassus*, (*Phrynomorphus*, Curt.,) &c.; but the position of the antennæ, ocelli, &c. evidently allies it to *Bythoscopus*, Germ., from which its depressed form will at once distinguish it. There is but one British species, which appears to be undescribed.

Sp. 1. *B. irroratus*. Flavo-viridis; alis superioribus fusco-punctatis.

Long. corp. 2¼ lin., lat. corp. 1¼ lin.

Yellowish green; superior wings finely sprinkled with minute fuscous punctures.

Three specimens were taken by Mr. Waterhouse near London, to whom I am indebted for the specimen I possess. A specimen will be found in the Museum of this Society, presented by that gentleman.

XII. *A few Observations upon the Habits of the Indigenous* Aculeate Hymenoptera, *suggested by M. de St. Fargau's Paper upon the Genus* Gorytes *in the first Number of the* 'Annales de la Société Entomologique de France.' *By* W. E. SHUCKARD, *Esq., M.E.S.*

[Read March 3, 1834.]

IT is rather a remarkable circumstance, that entomologists in general, in this country, have hitherto paid but little attention to the Aculeate Hymenoptera; a tribe so peculiarly interesting from its œconomy and habits, that we might reasonably have expected that some portion of the attention which has been lavished upon several other orders should have turned upon this. We might easily account for this neglect, were there much difficulty in observing or collecting these insects; but when we remember that every sunny bank and sandy spot will furnish them, I am induced to attribute this general indifference, partially, to the deficiency of an easily accessible and collective work upon the subject. But it is far from being thus satisfactorily answered, for we possess a work upon a portion of this tribe,—the Bees of Great Britain,—which, I conceive, has never been surpassed in the annals of entomology for accuracy or acumen,—it will be readily understood that I allude to our esteemed Honorary President's 'Monographia Apum Angliæ;' a book to which (although published thirty years ago) but very few additions could as yet be made, and which is, perhaps, the most beautiful model of an entomological monograph extant. And yet this work, which should be the canon of practical writers, has stimulated but few to attend to our bees, and the majority of collections are either very deficient in them, or in great confusion. We must therefore seek elsewhere for the true cause of this neglect, and shall perhaps find it in the predominant taste of the more influential entomologists, whose zeal excited a spirit of competition, which directed attention solely to those orders to which they themselves had been almost exclusively devoted.

The insects I chiefly allude to in these observations, and particularly where I complain of the indifference shown to them, are comprised in a subsection of the Aculeate Hymenoptera, and are what are generally called *Sand-wasps*. They form Latreille's second family, of the second section of the order, to which he has given the name of *Fossores*, or 'burrowers,' from the circumstance of the majority of the family forming little burrows in sand or earth, for the purpose of depositing their eggs therein, with a sufficiency of food, consisting of other insects, either in their undeveloped or their perfect state, for the nurture of the larva upon the hatching of the egg. In their second, or larva state, they are consequently all carnivorous, as well as the true wasps, or *Diploptera*; thus differing from the *Melliferæ*, or bees, which supply their larvæ with an admixture of honey and the pollen of flowers made into a kind of paste. Into these two divisions of Bees and Wasps, the Aculeate Hymenoptera are thus readily separated by the very nature of the pabulum upon which the larva is fed; the wasps (I take the term in its broadest signification,) forming a tribe which, although much fewer in numbers than the bees, may, I think, certainly vie with them in the interesting nature of their œconomy and in their personal history, for their habits are decidedly as varied as the habits of the solitary bees; and the social bees may find competitors for attentive and interesting observation in the œconomy of the true wasps, and the family of ants, if we institute the comparison without reference to their uses to man.

But the chief object of my present address (admitting, however, my earnest wish to call the attention of practical entomologists to this very interesting tribe,) consists in my anxiety to stop, as early as possible, the diffusion of error which might ensue from the generalization of a fact discovered by a very eminent French Hymenopterist, Le Pelletier de St. Fargeau, unless previously restricted within certain limits,—which, I hope, I am enabled to do with precision, from the knowledge obtained from that only safe source, the patient and attentive observation of nature; truth, and not theory, being the object of my quest.

The study of structure frequently either leads to the corroboration of observations upon the œconomy of insects, or throws out suggestions which experience confirms. This has been remarkably the case with the Aculeate Hymenoptera. The Rev. Mr. Kirby, whose work I so recently mentioned, was induced to surmise, from the absence of polliniferous instruments in the genus *Melecta*, one of the bees, that it might be a parasite upon another of the family; and this supposition derived additional strength from its being found by Mr. Trimmer in the nest of *Anthophora retusa*, which subsequent observation ascertained to be the insect whereon it was parasitic. Several other genera of bees are in the same predicament; but no investigations hitherto made will enable us to ascribe these cuckoo bees to their relative fosterers. (See Note 1.) But the term parasite must be here understood in a different acceptation to which it is received in reference to the *Ichneumones* and the *Chalcididæ*, these being strictly internal parasites; whereas the larva of the parasitic bee or wasp is supported at the expense of the larva of the insect which collected the food, by consuming what she had laid up for the use of her own progeny. This naturally suggests the idea that the egg of the parasite may possibly be disclosed more rapidly than that of the insect which laid up the store; but of this we have no certain knowledge, nor indeed of anything that takes place within the nest: but that the larva of the parasite is carnivorous, may, I think, be absolutely negatived with respect to the bees; and, therefore, although the food is consumed, the larva itself is left untouched, but is starved to death in consequence of the failure of its supplies: but with respect to the wasps, I have not the least doubt that the heir is consumed as well as his inheritance.

M. de St. Fargeau followed up this hint upon perceiving, in his examination of the structure of the Fossorial Hymenoptera, that some possessed the anterior tarsi ciliated on the outside; and when thus armed, the posterior tibiæ were likewise furnished, through their whole length, also on the outside, with spines or teeth: but in others the cilia were wanting, and, that, always when thus formed, their concomitant, the spines of the hinder tibiæ, were either deficient or obsolete. Well acquainted with the burrowing habit of the majority of these insects, he was induced to infer that the cilia of the tarsi were employed to facilitate the insect in forming its burrows, and that the spines of the posterior tibiæ (not the calcaria which arm the apex of the limb,) assisted it to carry its prey; and consequently such as were unfurnished with these auxiliaries were unable to burrow or convey a prey, and must therefore be parasitic. This theory he has stated in several articles of the tenth volume of the 'Encyclopédie Méthodique,' in an early number of Guerin's 'Magazin d'Entomologie,' and has made practical use of it in an analysis and subdivision of Latreille's genus *Gorytes*, in the first Number of the 'Annales de la Société Entomologique de France.' I was highly gratified when I first heard of this, and considered it a discovery of an analogous value to that made by Mr. Kirby, of the males of the Aculeate Hymenoptera having one joint in the antennæ, and one segment in the abdomen, more than the females. But my pleasure was much decreased, upon inspecting my collection, to find that it furnished me with a negative to the general application of the rule. For chance led me to apply it, in the first place, to the genus *Crabro*, and here I found *C. cephalotes* with simple tarsi, but with the posterior tibiæ spinose; an anomaly that I could not account for at the time, as I have taken it repeatedly with its prey, and watched it while employing its mandibles in forming a cylindrical cell in decaying trees: thus the application of St. Fargeau's theory here would treat as a parasite one of the most ferocious and predatory of this tribe. This is precisely the case also with several other species of the same genus. I next took the genera in regular sequence, and found the genus *Sapyga* simple in both tarsi and tibiæ, and this genus, by St. Fargeau's own admission in his remarks upon it in the 'Encyclopédie Méthodique,' is certainly predatorial, as he states having captured *Sap. punctata* with its prey, which it dropt when caught, but which he detected to be a larva. (Note 2.) We may therefore safely treat it as a true *Fossor*, although from the nature of the material in which it nidificates it would certainly use its mandibles instead of its tarsi, in excavating its little cylindrical cells, and we accordingly find that Nature has provided it with the former excessively strong, and the latter very slender and simple. These instances induced me to suspect that I had detected a clue to the probable cause of this apparent anomaly (Note 3.); for, knowing that these insects nidificate in wood, I surmised that their habit was a consequence of their structure, and that therefore the theory must be limited to such as are strictly burrowers in sand or earth; and which subsequent investigation has tended to confirm; for I have invariably found such as nidificate in wood, deficient in the ciliæ of the anterior tarsi, although having the posterior tibiæ occasionally spinose, which seems to support St. Fargeau's opinion, that they are used to assist in conveying their prey, an opinion however that I cannot coincide in for reasons which I shall presently state. In the genus *Pompilus*, some, as the *P. bifasciatus* of Fabricius and the *P. petiolatus* of Van der Linden, are simple in the tarsi and posterior tibiæ; but I suspect they nidificate in wood. The black species of *Psen*, as I have observed, nidificate in wood, although their tarsi and tibiæ are simple; hence the species of this genus cannot be placed in the class of Parasites. With respect to *Trypoxylon*, I think there can be no doubt as to its being a parasite, as it is a very common insect, and constant opportunities occur for detecting it with its prey, were it predatory. In the genus *Pemphredon*, I suspect that only *P. insignis* is parasitic,—the majority of them nidificate in wood; but the *P. minutus* I have taken only in sand, and as its anterior tarsi are simple, although the posterior tibiæ are spinose, it may possibly be a parasite; but future observation will determine this point, as well as decide which may be treated as parasites among the sand-burrowers in general. But I think we may entertain little doubt as to the genera *Ceropales*, *Dolichurus*, and *Nysson* being assignable to that class, and *Gorytes mystaceus* is, I have no doubt, also a parasite, and has thus acquired a certain degree of celebrity by suggesting this discovery. Those which I have not named are all true *Fossores*, taking them as they appear in the published lists.

With respect to St. Fargeau's auxiliary character, the spines of the hinder tibiæ, which he considers as assisting the insect in conveying its prey, I have already indicated that I do not subscribe to, and for the following reasons: they are invariably placed on the outside of the limb, and the insect in carrying its burthen would necessarily clasp it with the inside; exclusively of the fact of my knowing only one genus that uses its posterior legs for this purpose. Were this, therefore, their sole use, it would be derived merely from the strength they might add to the member; but I conceive their chief importance is to assist the insect in burrowing, for although some species convey the particles of sand or earth out of their burrow by their mouth, and pile them at its entrance for the purpose of closing it after having deposited their progeny within, to secure them from the ingress of ants or their parasites (Note 4.), yet many species burrow like a fox, tossing the sand out behind them with their posterior legs; and in the same way those which nidificate in wood pass the particles beneath them, and eject them behind by means of the spines with which their tibiæ are armed, which fact I have frequently observed while watching the habits of *Crabro cephalotes*. Besides the evidently ill-adapted position of the spines for aiding the insect in carrying, I have noticed the genus *Oxybelus* alone, to convey its prey by means of its hinder legs. *Pompilus* and *Ammophila* walk backwards, dragging it with their mandibles; and the perseverance with which they overcome all difficulties, and place it where they have selected their hiding-place, is remarkable. *Astata, Tachytes, Psen, Crabro, Mellinus,* and *Cerceris* fly boldly and directly forward with it in their mandibles, assisted by their fore legs. It would be desirable to ascertain if the several species are restricted to one kind of prey. As far as my observation goes I have found it to be the case, and generally that prey consists of larvæ, I suppose from their being more succulent, and yielding more nutriment than the perfect insect; and it is a remarkable circumstance that, however sanguinary and bold they may be in their attack upon their victims, I have never observed any but the species of the genus *Vespa* feeding upon their ravin, nor have I observed any but females make the attack. It would therefore seem that maternal solicitude alone prompts them in their apparent rapacity, for it is to the nectar of flowers that they resort for their own subsistence. They differ much with regard to their prey, as far as my observation goes: the prey of *Pompilus viaticus, fuscus, exaltatus,* and *gibbus* consists of different species of spiders; *P. niger* attacks a small sandy-coloured larva. *Ammophila hirsuta* and *vulgaris* I have detected dragging along large black spiders, very much swoln, I presume from the effects of the venom with which the insect renders them torpid. *Psen equestris* and *bicolor* bring home the larvæ of *Homopterous* insects, which differ; and it is a curious fact that the *bicolor* is gregarious and the *equestris* solitary in its habits. *Astata Boops* diminishes the numbers of the larvæ of *Pentatoma bidens,* for I have frequently taken it on Hampstead Heath with that prey. *Pemphredon unicolor* preys upon an *Aphis. Lyrops,* or more properly *Tachytes pompiliformis,* I have caught with the larva of a small Lepidoptera; *Oxybelus uniglumis,* with a small Dipterous perfect insect; *Crabro cribrarius* and *patellatus,* with Diptera also, as well *Mellinus arvensis. Cerceris læta,* according to Latreille, quoted by Mr. Curtis, preys on an *Andrena,* and *Philanthus Diadema* upon a species of *Halictus.*

These few observations will show what a field lies open for the observer, and what a harvest remains to be reaped.

I think I have sufficiently proved, what I set out with the intention of doing, that the discovery made by St. Fargeau does not admit of general application, and must be restricted to the *Fossores* that nidificate in sand and earth; and that the use of the spines of the hinder tibiæ is certainly not to aid immediately in the conveyance of prey, although it generally accompanies the ciliation of the anterior tarsi, but may rather be considered as instruments for assisting the insect to burrow.

I have only further to remark, that the seemingly most trifling observation may become of paramount importance in teaching us the function of an organ, or by its intercalation with other observations may, like a link in a chain of circumstantial evidence, convey the strongest conviction, and give corroboration to what was previously built upon presumption alone.

I will conclude, but I must first apologize for having wasted so much of your time, and I fear entirely exhausted your patience; but I beg this may be imputed solely to my zeal for our science: and these cursory remarks will have attained their purpose should they stimulate our practical entomologists to record all,—even their most minute observations, and impart them to the Society, whether individually or, if so fortunate in their collection of these fugitive emissions, in a body. They will speedily accumulate, and enrich us with a series of facts which must in themselves give an importance to our proceedings, and add a stability to our lucubrations by fixing them upon the explicit confession of Nature herself.

NOTES.

Note 1. *page* 54.—The genera of British bees supposed to be parasitic are *Hylæus*, *Sphecodes*, *Nomada*, *Epeolus*, *Stelis*, *Cœlioxys*, *Melecta*, and *Psithyrus* (first separated from *Bombus*, but not named, by Mr. Kirby; kept separated as Divisio 2. by Dahlbom in his Monograph of the Scandinavian Bombi, but raised into a genus with the preceding name by St. Fargeau in the fourth Number of the 'Annales de la Société Entomologique de France'). All that is known of the habits of the parasitic bees (and that is but very little,) rests upon mere conjecture, and to which I now contribute my mite. I have the strongest possible reason for supposing that *Nomada Schæfferella* is parasitic upon *Eucera longicornis*, for I have taken it several times this year entering the burrows of that bee, and nowhere else; but I hope to confirm this supposition next year by breeding it from the store laid up by the *Eucera:* and *Nomada ferruginata* is, I suspect, a parasite of *Andrena fulvescens*, for I have constantly taken it entering the cell of that insect. The *Nomada ruficornis* flies chiefly about hedge-rows, and is probably parasitic upon *Andrena Trimmerana* or *A. nitida*, which both burrow in hedge-banks as well as *A. cingulata*, thus differing from those which nidificate in bare sandy situations. I would throw out the suggestion that as some of the *Andrenæ* are distinguished from the rest by the greater density and length of their scopa and flocculus, it is probable that these latter chiefly may nourish parasites. I suspect we may have more than one species of the genus *Melecta*, for I have taken specimens differing widely in the colour of their hirsuties, infesting the nests of *Anthophora retusa*, *A. Haworthana*, and *Eucera longicornis*.

Note 2. *page* 55.—Mr. Bakewell of Nottingham has recently informed me that he has captured this insect while thrusting its abdomen into the cells of *Osmia cærulescens*. I have taken *Melandria Caraboides* repeatedly doing so, this year, into the cell of *Chelostoma maxillosa*, and with the ovipositor exserted to its utmost length. I am not aware of this circumstance having been previously noticed. It seems that *Chelostoma maxillosa* nourishes several parasites, as *Fœnus Jaculator* and *Pimpla Manifestator* are said to deposit their eggs in her nest.

Note 3. *page* 55.—The theory itself is rendered very doubtful by my having captured *Gorytes campestris* of St. Fargeau (which, according to him, should be a parasite, from its simple legs and tarsi,) conveying its prey, the pupa of *Tettigonia spumaria*, into its cell, excavated in the vertical section of a sand-bank: the burrow was about four inches deep, and took rather an oblique direction inclining downwards. By the absence of provision, this was evidently its first journey after completing its labour of digging the cavity. It would have pleased me better to have captured it the following day, when doubtless there would have been a store of food laid up, as well as eggs deposited, but I was too anxious to secure its testimony to emancipate it, and I therefore preserve it with its prey in my collection. The fact related by Mr. Westwood in a short paper recently read by him, of having taken *Odynerus Antilope* with a green larva, does not bear so strongly upon the point as my instance, as St. Fargeau's theory does not extend to the Diploptera, none of which have either cilia or spines to their tarsi and legs, although in habits they differ materially; but I much doubt whether any but the genus *Vespa* are social. It will be understood that I allude to British ones only.

Note 4. *page* 56.—I here embody in a note the few observations that were read on the 5th of May 1834, and which were drawn up by me as supplementary to this paper. " Since the reading of my paper upon the habits of the Aculeate Hymenoptera, but chiefly the Fossores, and wherein I was induced to express much doubt as to the plausibility of the supposition of St. Fargeau, that the spines which arm the tibiæ of the majority of this tribe were for the purpose of enabling the insect to convey its prey, it has been my good fortune to meet with a specimen of the female of *Crabro cribrarius* which will possibly tend to solve satisfactorily this problem. From the observed habits of some of these insects it is a well-known fact that the female closes the aperture of the burrow wherein she has deposited her egg and the supply of food for the nourishment of the larva when disclosed. Instinct guides her to do this to secure her delicate progeny from the attacks of the insects that might be fatal to it, or might possibly consume its provision, and perhaps also for the exclusion of the atmosphere, which in some situations would too quickly absorb the moisture of the provision laid up in store, (for the cell is always excavated beyond the mere dry exterior crust into the damp sand beneath), although I expect that the egg is speedily hatched, and the insect changes into a pupa before winter, in which state it lies dormant until it is called into active existence in the ensuing spring, when it comes forth to revel in the enjoyment of life, and to perform its more important functions in the œconomy of Nature.

This fact of their stopping up the hole of their burrow being well attested, and indeed a matter of almost daily observation with such entomologists as prefer watching and investigating the habits of insects, and who in their rambles through the fields delight in contemplating Nature generally, finding

" Tongues in trees,
Books in the running brooks, sermons in stones,
And good in everything,"

to the mere acquisition of specimens, may, I think, safely be applied by analogy even to such (not being parasites) from which good fortune or recorded observation has not yet lifted the veil.

The specimen of the female of *Crabro cribrarius* which I mentioned above, has the posterior tibiæ loaded on each side with a thick plaster of clay. The riddle is thus solved, the spines are thus evidently intended to enable the insect to convey the materials with which she closes her burrow, which a smooth surface could not accomplish. The apex of the intermediate and anterior tibiæ on one side have also some portion of this substance, the greater part of which may perhaps have been rubbed off in its capture, or I took her before she had quite completed her task. It is but in very few of these insects that the anterior tibiæ are spinose and restricted to such as are absolutely fossorial in the strictest application of the term, and not extended to the non-parasites which burrow in wood. That the anterior and intermediate tibiæ, as well as the plantæ of the latter, are occasionally employed to convey building materials, I have a very strong proof in a specimen of *Bombus terrestris* in my possession, which has all these limbs thickly covered with clay, and the posterior corbiculæ loaded to a degree which must have been a great encumbrance even to so robust an insect; and which I think tends to prove that it went some distance to fetch it, or that its use was very urgent, otherwise, with its well known rapidity on the wing, it would have accomplished several journeys in nearly the same space of time as from the impediment offered to its flight by being so loaded it executed this single one. I have also this year taken a female *Psithyrus* which has some clay on the superior surface of the apex of the posterior tibiæ and plantæ, which perhaps indicates that although supposed to be strictly parasitic, it yet takes some share in the domestic œconomy of the nest, and which supposition is strengthened by the circumstance that it is most certainly not an accidental adhesion, nor is it so in either of the cases cited above. We thus see that Nature never works without a purpose,—she is too strict an œconomist of time and material,—and we may therefore rationally infer that where an organ exists, a function necessarily coexists, although too recondite for our ready apprehension, and which analogy or chance may ultimately discover.

XIII. *On the Habits of some Indian Insects. By* W. W. Saunders, *Esq., F.L.S., &c.*

[Read April 7, 1834.]

In the hope that the following remarks on the habits of a few Indian insects may not be thought uninteresting to entomologists, I am induced to submit this communication to the Entomological Society. The facts are chiefly taken from a note-book in which I recorded the observations as they occurred.

I captured many specimens of the *Lamia Rubus*, Fab., in the neighbourhood of Calcutta on the Pipal tree (*Ficus religiosa*) during the months of May and June. These insects cling very tightly to the branches, so much so that it is difficult to detach them, except by violent shaking. When on the wing, they fly well in a direct line, and their great size gives them somewhat the appearance of small birds. Their food consists of the round buds of the Pipal, and not the leaves as might be supposed by those who had not paid attention to the subject. I ascertained this fact by carefully watching the insect several times whilst feeding, and I invariably observed it eating the buds, whilst the leaves around were untouched. This species of *Lamia* may at times be detected in the tree by a grating noise, caused by rubbing the back part of the head against the anterior margin of the thorax. When handled, this noise seems to be produced louder and more rapidly than on the tree, so much so that at twenty paces distant it may be heard. The mandibles of the insect possess great strength, a fact I am particularly aware of from having once been bitten by one on my little finger, when it made its jaws meet in the flesh, paining me exceedingly, and causing a wound which, from not healing well, I shall long bear the mark of. While the operation of feeding is going on, the antennæ of the insect are motionless, but upon touching them on the body ever so slightly, a quick horizontal motion of these organs (probably the result of fear,) immediately commences, and is continued for some time. I have only observed this insect upon the Pipal tree, where however it may be taken abundantly. I was not able to obtain any information respecting the immature states of this species.

If diligent search be made under the bark of the Mango (*Mangifera indica*) and Lichi (*Dimocarpus Litchi*), the *Cossyphus planus*, Fab., (*depressus*, Lat.,) will be found. The remarkable flatness of this insect allows it to creep into very narrow cracks and crevices of the bark, so that in searching for it every interstice ought to be well examined. When the bark is removed, the insect is found adhering to the tree; and as it remains motionless in that position, it may easily escape notice, the colour of the bark being very similar to that of the insect. I have taken several of these insects near Calcutta, in Garden Reach, but never in any abundance; generally singly.

The *Cicindela sexpunctata*, Fab., is frequently taken during the evening in the apartments at Calcutta. They are attracted by the light of the lamps, and to an accustomed eye may easily be distinguished by the rapidity with which they dart round the light, and almost immediately settle on something near. It is somewhat difficult to catch them in their night excursions, they are so very quick, and fly off the moment an attempt is made to capture them. Although frequent in the rooms during the evening, I have never seen the insect but once during the day; a circumstance arising, I should think, from my not knowing where to find it at that time.

Another species of *Cicindela*, which I propose calling *limosa*, and which is probably undescribed, was captured by me one evening in abundance, and only on that one evening, whilst in a boat at anchor off a mud bank near Diamond Harbour in the river Hooghly. It was in the beginning of June, and the tide failing us, we were obliged to anchor close to the bank. Whilst thus situated we observed many of this species of *Cicindela* fly into the cabin, and dart towards a light which was in a lantern, striking so violently against the glass that they immediately fell upon a bench on which the lantern stood, so that I was able to take specimens of them. Unless where given by myself, I have not met with them in the cabinets of entomologists.

A third species of *Cicindela* is found on pathways at Ackra in the neighbourhood of Calcutta. It is a most active insect, flying rapidly and running very fast. Being of a dark brown colour, it is very difficult to be seen when on the path, a difficulty which is increased by its small size, so that I took but very few specimens of it. A description of this species, which appears to be unknown, will also be found at the end of this paper; it is named *Prinsepii* after James Prinsep, Esq., F.R.S., of Calcutta, a zealous promoter of science in all its branches, and whose labours are not sufficiently known in this country.

Euchlora viridis, MacLeay, is frequently attracted into the rooms at night by the light of the lamps, and the large *Copris Molossus* is an occasional night visitor.

On the banks of the Hooghly, a few miles below Calcutta, two new species of Mr. Hope's subgenus *Anthelephila* were captured in the month of April, running about the roots of grass among sand in abundance. Some British species of *Anthicus*, a genus from which *Anthelephila* has been separated, are found also at the roots of grass among sand, a fact indicating that *Anthelephila* and *Anthicus* are nearly allied in habits as well as form. These two species are described under the names of *ruficollis* and *mutillaria*; the latter, from the insect resembling a small *Mutilla*, as suggested to me by Mr. Westwood.

At Saugor Island, in the mouth of the Hooghly, I have frequently noticed the cells, which are built of mud, by a species of *Eumenes*. The cells are generally placed under some projection, or in an angle, where they are very firmly fixed. They are of an oval shape, sometimes two or three together, placed side by side. Each cell is somewhat smaller than a pigeon's egg, and before being closed up, is well stored with green caterpillars, which I have often amused myself by watching the *Eumenes* carry into the cells. When the cells are sufficiently stored, they are filled up so very neatly with mud that it is difficult to discover the entrance. One of these nests was found in a keyhole, closing the aperture; another, in a bungalo at Ganga Saugor, was beautifully constructed inside an old flute, the insect having chosen one of the note-holes for the entrance to the nest. At Mud Point, Saugor, I observed several of these nests already built and sealed up; others the *Eumenes* were storing with caterpillars, while some were in progress of completion. I took down one of the sealed nests and broke it open to examine the interior, and was surprised to see a species of *Pelopæus* come out lively and strong, an insect not known to subsist on the stores of others, as this fact seems to prove. This *Pelopæus* was a male, with a black body, excepting the peduncle, which was yellow; two spots behind the head, and a third a little behind the junction of the wings with the trunk, are of the same colour. The antennæ are black. Legs black and yellow. Wings of a brownish yellow cast, with the tips gradually growing dusky. Length half an inch. A female of the same species in my possession is seven tenths of an inch long. The species of *Eumenes* whose œconomy is detailed above is about an inch long. Body chestnut brown, with an undefined black band across the first joint of the abdomen beyond the peduncle. Antennæ and legs of a chestnut brown, but rather lighter than the body. Wings yellowish brown, with the tips dusky.

Pelopæus has never been considered a parasite, but as building nests resembling those of *Eumenes*. My observations go far to prove that they are parasitic, and I presume that in former descriptions the *Pelopæus* has been described as the architect of the nest, instead of *Eumenes*, the real constructor: this error might easily occur to those who had not witnessed the *Eumenes* at work.

Having frequently noticed cases of an oblong oval shape attached to the walls of rooms in the houses at Calcutta, and supposing them to be the abode of the larva of some insect, I opened some of them and inclosed others in a bottle. In some of the specimens examined a chrysalis was found, in others a larva, and in others merely exuviæ of a chrysalis. From those in the bottle there proceeded in time some small moths. The cases are generally attached to walls or partitions by silken threads of considerable tenacity, and are to be seen sometimes pendent from a beam or the ceiling. They are half an inch long by one fifth of an inch broad in the widest part, nearly flat, the longitudinal and transverse sections being lens-shaped, and margined along the sides. They are open at both ends, although attached to the walls at one end, the attachment being so managed as not to stop the entrance. The inside is lined with a silky substance, the outside covered with small grains, resembling sand. The larva when full grown is about three tenths of an inch long, with the head and first three segments of the body dark brown, the remainder white. It has six legs placed on the first three segments of the body, two on each segment. The chrysalis is of a pale yellow brown, and about a quarter of an inch in length. The moths were lost by an accident, and therefore cannot be minutely described. They approached in size the cloth-moth, and the upper surface of the wings were of a silvery brown. The larva has the power of turning within its abode, and if watched when fixed to a wall may often be seen protruding its head and legs, sometimes at one end, sometimes at the other, as if in search of food. I have always found the cases tightly fixed, yet the larvæ have the power of locomotion. One of the larvæ with its envelope, which I detached from a wall and placed upon a table, was very active in moving it about, by protruding the head and legs and then laying hold of the table, when by a contraction of the body the case was moved forward, and as these jerks were rapidly repeated, the larva and its abode made considerable progress. When the progress of the larva was obstructed, it immediately withdrew into its home, and turning itself, began to retreat at the other end. Whilst on the table, it fixed its house several times, an operation so quickly performed as scarcely to be perceptible. I always found the cases nearly of the same size, whence we might be induced to suppose that at first the larvæ had the instinct to make an abode sufficiently large to suit themselves when fully grown. I could never determine the food of the larva, nor the manner in which it constructs its interesting habitation, particulars which I hope some other observer will supply. In so vast a field as India, where there are so many Europeans who have leisure, it is much to be regretted that there are so few observers of the insect creation. Valuable discoveries might doubtless be made, and many new facts brought to light, which would be highly interesting to the naturalist and particularly to the entomologist.

Descriptions of the New Species of Coleoptera referred to in the preceding Observations.

CICINDELA *of Authors.*

CICINDELA LIMOSA, *Saunders.* Plate VII. fig. 6.

Olivaceo-viridis, subcupreo-nitens, elytris margine tenui ochraceo cinctis.

Long. corp. $\frac{4}{10}$ unc.

Habitat Diamond Harbour, flumine Hooghly, Indiæ Orientalis.

Description.—Olive-green, with coppery shades. ***Head*** rather broader than the thorax, with two punctate impressions between the eyes. *Mandibles* and *palpi* ochraceous, tipped with black. *Labrum* ochraceous. *Thorax* cylindric, ovate, truncated before and behind, with a transverse, punctate impression towards the head and another towards the scutellum, with a faint impression joining the two, down the centre. *Elytra* minutely punctured, with a narrow, ochraceous margin, extending from the base to the apex. *Legs* very long, pubescent. ***Femora*** shining green; the knees red. ***Tibiæ*** red, with the apex green. The *female* has two polished, green, round, discoidal spots, one on each elytron.

Found at Diamond Harbour, River Hooghly.

Cicindela Prinsepii, *Saunders.* Plate VII. fig. 7.

Obscure nigro-fuscescens, elytrorum singulo maculis tribus parvis ochraceis, pone medium, notato.

Long. corp. $\frac{7}{16}$ unc.

Habitat in semitis apud Ackra prope Calcuttam.

Description.—Black-brown. ***Head*** with the eyes very prominent. ***Thorax*** narrower than the head, long, and nearly cylindric. ***Elytra*** rather broader than the head, very convex; each elytron marked with three small ochraceous spots, a little below the middle, placed in a triangle; two on the margin, linear, and at right angles to it; the third discoidal, round. ***Body*** beneath shining purple. ***Legs*** with shades of brassy green, particularly beneath.

Inhabits pathways at Ackra, near Calcutta.

Anthelephila, *Hope.*

Anthelephila ruficollis, *Saunders.* Plate VII. fig. 8.

Nigra, nitida, pubescens, thorace femorumque basi rufescentibus.

Long. corp. $\frac{3}{16}$ unc.

Habitat in sabuletis, ad ripas fluminis Hooghly.

Description.—Glossy black, except the thorax and base of the thighs, which are reddish brown. The ***head*** is slightly punctured, and the whole insect covered with very short pubescence.

Inhabits sandy places on the banks of the Hooghly.

Anthelephila mutillaria, *Saunders.* Plate VII. fig. 9.

Rufescens, albo longe pilosa, capite fasciâque transversâ elytrorum nigris.

Long. corp. $\frac{3}{10}$ unc.

Habitat cum præcedenti.

Description.—Head black, deeply punctured; some long hairs proceeding from just behind the eyes. *Antennæ* black, with the three basal joints reddish brown. *Thorax* reddish brown, deeply punctured, pubescent. *Elytra* reddish brown, with a broad black band across, a little beyond the middle, clothed with long white hairs, particularly from the posterior margin of the band to the apex. *Legs* hairy, dull black, with the base of the thighs reddish brown. The *thorax* in this species is not so long and attenuated as in *A. ruficollis*, and the coleoptra are less oval.

Hab. the same as the last.

XIV. *Description of a new Species of Longicorn Beetle from the East Indies. By* G. R. WATERHOUSE, *Esq., late Curator of the Entomological Society.*

[Read March 3, 1834.]

Fam. PRIONIDÆ.

Genus REMPHA'N.

CAPUT longius quàm latum: mandibulæ prominentes bidentatæ. *Labrum* transversum, parte anteriori emarginatum. *Labium* minutum, apice bilobatum. *Palpi maxillares* modici, 4-articulati; articulo primo brevi, sequentibus ferè æqualibus. *Palpi labiales* 3-articulati; articulo primo brevi, secundo elongato; tertio modico, apice truncato. *Antennæ* filiformes, 11-articulatæ; articulo primo crasso, secundo brevi, tertio primo æquanti, posticeque spinis armato; articuli septem sequentes ferè æquales, graciles; articulo apicali cæteris longiori.

Thorax subquadratus, marginibus lateralibus spinis armatis. *Elytra* subcoriacea. *Pedes* modici, femora tibiæque triplici serie spinarum armata.

Abdomen subdepressum.

Species 1. *Remphan Hopei.*

Plate VIII. fig. 1.

Obscurè niger; thoracis disco utrinque maculâ triangulari nitidâque ornato; elytris pallidè brunneis.

Habitat in Indiâ Orientali circa Singapore.—Long. capitis cum mandibulis lin. 11.—Long. corporis 2 unc. 11. lin.

Description.—Obscure black. *Head* obovate, obscurely rugose throughout, with an indistinct ochreous pubescence; a longitudinal line dividing the head into two equal parts, reaching from the base to the apex, and which is depressed between the eyes, and slightly elevated posteriorly. *Eyes* large. *Mandibles* long and prominent, bidentate internally. *Thorax* transverse quadrangular, and narrower anteriorly, the sides and anterior angles thickly set with spines, a triangular glossy patch on each side of the disc, and another which is smaller between that and the lateral margin; also a glossy rugose ridge reaching from this last to the posterior angles of the thorax; at the anterior angle of the first-mentioned triangular patch is a shallow depression, which is filled with a short ochrecus pubescence. *Scutellum* rather large, semiovate, pitchy black, obscurely punctured, and having an indistinct longitudinal elevated line. *Elytra* pale pitchy brown, inclining to a chestnut colour towards the base and at the suture, finely punctured throughout, and furnished with three obsolete raised striæ on each side; the elytra are elongate, and nearly parallel, slightly attenuated posteriorly; each elytron is furnished with a minute spine at its apex. *Legs* moderate, femora and tibiæ rugose, and thickly armed with small spines. *Tarsi* broad and flat, and of a brown colour. *Antennæ* with the eight terminal joints pitchy brown, the third, fourth and fifth joints are each furnished with a minute spine at the apex; the basal joint is coarsely punctured.

I have named this fine species in honour of the Rev. F. W. Hope, in testimony of his kindness in allowing me the free use of his most extensive and valuable collection.

Note.—In the drawing, the head is represented as bent forwards, consequently some additional length must be allowed for the foreshortening of the mandibles.

XV. *Description of a new Curculionideous Beetle from the Swan River. By the Rev.* F. W. Hope, *F.R.S. &c., President.*

[Read May 5, 1834.]

Fam. CURCULIONIDÆ.

Genus. Amycterus, Schönherr.

Species. *Amyct. Schönherri.*

Plate VIII. fig. 2.

Niger; rostro brevissimo, lateribus medioque thoracis seriatim nodulosis, elytris spinosissimis.

Long. corp. lin. 14. lat. 5.

In Mus. Dom. Hope.

Habitat in Nova Hollandia, apud Swan River.

Totum corpus nigrum.

Rostrum breve et crassum; suprà inæquale canaliculatum; apice emarginatum. *Thorax* suborbiculatus, lateribus ferè in spinam utrinque productis; anticè posticèque constrictus, depressus, marginibus medioque dorsi duplici serie noduloso. *Elytra* spinis horrentia. *Femora* inermia, tibiis unicalcaratis.

In honorem celeberrimi Schönherri denominatus.

PLATE VIII.

Fig. 2. The insect of the natural size. 2 *a*. The head seen in profile.
2 *b*. The tarsus.

XVI. *Observations on the osculant Crustaceous Genus* Arcturus *of Latreille; with the Description of a British Species.* *By* J. O. Westwood, *F.L.S. &c.*

[Read March 3, 1834.]

Taking advantage of the presence of those distinguished men who this evening honour us with their presence[*], I beg leave to offer to the notice of the Society the description of a curious genus of Crustaceous animals, interesting not only on account of its comprising a species which has hitherto been found only in the Arctic Seas, but also from the peculiar situation which its singular structure entitles it to hold in the class of animals to which it belongs.

The great division named by Dr. Leach *Malacostraca Edriophthalma*, comprises those hard-shelled Crustacea which have three pairs of foot-jaws, five pairs of legs, and two other pairs of organs resembling legs, but which in the Lobsters and Crabs are converted into additional foot-jaws; they have also the thoracic portion of the body divided into segments, and their eyes are not placed at the extremity of footstalks.

This division comprises three orders: 1st, the *Amphipoda*, or Leaping Shrimps, having the fore-legs generally large and cheliferous, and the body compressed and narrow; 2nd, the *Isopoda*, having the legs of equal size and unarmed, with the body oval and depressed, and composed of equal segments,—containing the Wood-lice and allied groups; and 3rd, the *Læmodipoda*, a singular group, having the body slender and cylindric, with unequal-sized legs, some being cheliferous, and the segments unequal.

The genus *Arcturus* of Latreille, although agreeing in many of its

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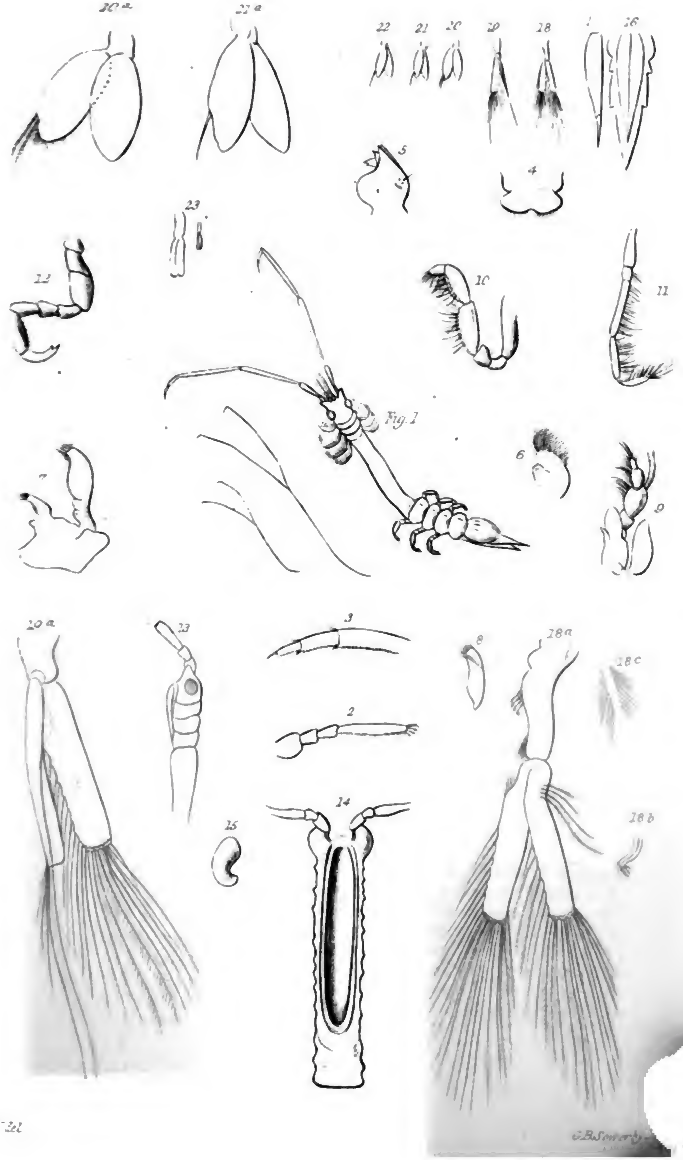
[*] Captains Sir John and James Ross were present at the Meeting when this memoir was read.



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G. B. Sowerby

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establishment as a subgenus distinct from the *Idotea Baffini*, I shall restrict the *generic* characters to those possessed in common by the two groups. Moreover, as Latreille evidently proposed the genus for the reception of the Arctic species, I shall consider the former as entitled to a distinct subgeneric name, although, perhaps, in strictness, (in consequence of its being evidently further removed from the typical structure of the adjacent genera than *Idotea Baffini*,) the typical subgeneric name (adopted from the generic one, as suggested by Mr. Jenyns in the No. of the Mag. Nat. Hist. for March 1834) ought to be given to *Oniscus longicornis*.

The following are the characters of the genus:

Corpus elongatum, gracile, cylindricum.

Antennæ 4, internæ 2 breves, externæ corporis toti saltem longitudine, divisione ultima articulatâ, et articulo 4to multò breviori.

Pedes antici dissimiles, 2 breves, compressi, supra os applicati.

Pedes 6 sequentes mediocres, gracillimi, directione anticâ, ciliati, articulo ultimo præcedentis ferè longitudine, simplici.

Pedes 6 postici crassiores, directione posticâ, unguibus bidentatis.

Abdomine segmentis 3, segmentum ultimum elongatum, apice subulato.

The want of mandibular palpi and of vesicular appendages at the base of the legs, as well as the structure of the subabdominal respiratory plates covered by a large pair of basal appendages (resembling a pair of cupboard-doors), clearly indicate that this genus belongs to the *Isopoda*; whilst the structure and number of segments of the abdomen and its branchial appendages place it in the family *Idoteidæ* of Leach, in which the only elongate genus is the British *Stenosoma*, from which the characters above detailed will sufficiently remove it.

The cylindric and elongated form of the body, however, joined to the dissimilar formed legs, the length of the 4th segment of the body, the ovarial pouch beneath this segment in the ♀, and the posterior direction of the hind legs, make a much nearer approach to the *Læmodipoda* than any other Isopodous genus.

The genus may be divided into two subgenera.

to be destitute of legs, and doubts are expressed as to the situation of the genus. The male alone is described. In the New Edinb. Phil. Journ. for October 1827, it is noticed that, as *Leacia lacertosa* is identical with *Oniscus longicornis*, the specific name must be changed; but that, as the animal was sufficiently generically distinguished from the other allied groups, the generic name *Leacia* might be retained. I believe, also, that Dr. Fleming published a description of the same animal in 1830, under the generic name of *Astacella*, which must of course be rejected. Amongst the *Crustacea* preserved in spirits at the British Museum, I have observed specimens incorrectly labelled *Corophium longicorne*.

Subgenus 1. *Arcturus proper*.

Char. Subgen.

Corporis segmentum 4um præcedenti tantùm paullo longius. Antennarum externarum divisio ultima multi-articulata. Pedum 2 anticorum divisio ultima præcedenti longior. Pedes 6 postici (e figura) longitudine decrescentes. Abdomen articulis 2bus anticis distinctis.

Type. *Idotea Baffini*. Sabine, App. Parry's Voy. Pl. I. fig. 4—6.

Syn. *Arcturus tuberculatus*. Latr. Règne An., 2nd edit. vol. iv. p. 139.

Several specimens belonging to this subgenus, and apparently to distinct species, are contained in the collection of the Zoological Society, and formed part of the collection of Arctic *Annulosa* brought home in Captain Lyon's voyage. Their size is much larger than that of our English species, being nearly 3 inches in length; they are also much more rugose.

Two of these specimens exhibit a remarkable peculiarity relative to the natural history of the genus.

The antennæ appeared, at first sight, to be covered for a considerable distance with a mass of sea-weed, of more than half an inch in diameter, so that these organs are thrust out of their natural position. On examining this mass more minutely, it was, however, discovered to be composed of the young of the animal, about a quarter of an inch in length, assembled in musters of 40 or 50 upon each antenna. One of these young ones was more advanced, being more than half an inch in length.

Subgenus 2. *Leacia*, Johnston.

Char. Subgen.

Corporis segmentum 4tum valde elongatum. Antennarum divisio ultima 3-annulata. Pedum 2 anticorum divisio ultima præcedenti multo minor. Pedes 6 postici æquales. Abdomen segmentis 2bus anticis in unum coalitis.

Type of this subgenus *Oniscus longicornis*, Sow. Brit. Misc., pl. 10.

The body is long, narrow, rugose, and cylindric, with the head and terminal segments rather broader in the male, but of an equal breadth throughout in the opposite sex. This latter is more than twice the size of the males; and in both, the body is of a whitish colour, with the terminal portion generally directed upwards.

The head is almost square, with the eyes prominent and nearly circular; its anterior angles are produced in front of the latter, forming a deep frontal emargination, in which the interior or upper pair of antennæ are inserted. The head is convex above, and rugose. The interior antennæ are not longer than the head, and 4-jointed, the basal joint large, the next two short, and the fourth long, cylindric, and terminated by setæ. The lower antennæ are nearly as long as the body, robust, and 8-jointed, the first joint very short, the second rather longer, with a deep external notch, the third about as long as the head; the two next are very long, each being about one fourth of the whole length of the body; the remaining joints are very short, and finely serrated beneath, each being gradually smaller, and the last being terminated by a minute acute joint. The antennæ are carried with a downward direction.

The parts of the mouth are very minute and delicate, varying in some respects from the trophi of *Idotea*, as figured in the great Work on Egypt, pl. xii. fig. 6. The lip is transverse, rounded at the sides, and emarginate in front.

The mandibles are small, horny, broad, with several teeth, one of which seems to represent the mandibular palpi of the *Sphæromidæ*, &c.

The interior pairs of foot-jaws are very thin, transparent, and deeply ciliated, without any appendage. The second pair of these organs are larger, with a terminal lobe, and a large external subarticulated appendage. The third or outer pair of foot-jaws are still larger, and furnished with a broad palpus composed of four joints, of which the second is the largest, and the fourth the smallest; they are also furnished with a large external basal appendage.

The first three segments of the body are very short, with a produced margin concealing the base of the legs, the first pair of which is unlike all the others, and evidently seem to perform the office of foot-jaws, notwithstanding their size; indeed, from the manner in which this as well as the three following pairs of legs are carried over the mouth, it would seem that they are employed rather as auxiliary organs of the mouth than as instruments of motion. The very slender structure of these three pairs of legs, which are all formed alike, and are strongly ciliated within, is also confirmatory of this opinion. The first pair of legs are long, also ciliated within, the ciliæ arising in a double series, and being often bearded: this also occurs in the second, third, and fourth pairs of legs, but only in two hairs situated near the extremity of the penultimate joint. What can be the cause of this peculiarity?

The fourth segment of the body is very long, occupying more than one third of the whole length of the insect, and being perfectly cylindric in the males, in which sex it is without any orifice or inferior lamellæ, and is the narrowest part of the body; but in the females it is as wide as the head, and furnished beneath with two thin membranaceous plates lapping over each other, and serving as an envelope for the eggs.

The fourth pair of legs is attached at the anterior angles of this segment beneath.

The three following segments of the body (terminating the thoracic portion) are short, rounded at the sides, and respectively furnished with a pair of strong legs, evidently formed for prehension, having the last joint terminated by a bifid hook. These legs are not ciliated.

There are only two apparent remaining segments, of which the first resembles the preceding, and is furnished beneath with a pair of long thin plates, which are articulated to this joint and the following at the outer edge, and are capable of shutting and opening like a pair of cupboard-doors. They are terminated by a slender acuminate process. On opening this pair of organs a most beautiful apparatus, consisting of no less than twenty-two distinct instruments, is exhibited, and which, under a magnifier of high power, presents the most elegant appearance.

At the base (in the male at least) is a pair of minute organs, terminated by two somewhat cultrate plates, and which are probably connected with the office of generation. The first double pair of subabdominal respiratory plates (which cover all the rest) succeed these, each of which is composed of a rather long and bent flat footstalk, having on the outside four curious bent ciliated setæ, and terminated by two long plates of a very delicate texture, and slightly scolloped at the extremity in a double series for the insertion of the ciliæ, which are very long and beautifully bearded: the base of the internal plate is also furnished with several long bearded setæ.

The second double pair of these organs is nearly similar, except that the basal portion is shorter and one of the plates is much narrowed.

The third double pair is very different, being composed of a very short footstalk and two large oblong-oval plates, one of which is plain on its margins, whilst the other is setose at the extremity, and is notched on the outside for the insertion of two longer bearded setæ.

The fourth and fifth pairs of these organs are also double, and like the third pair, except that the outer plate is not ciliated, and is furnished with a single plain seta at its outer margin.

The terminal segment of the body is large, convex, and terminated by an acute process, without any lateral swimming-apparatus, and exhibits at its base rudiments of an incipient articulation: moreover, there also appear traces of articulation at the base of the acuminate terminal portion of the joint; whence it is evident (as well as from the circumstance of there existing five sets of subabdominal respiratory plates,) that the abdomen consists of the ordinary number of segments, more or less soldered together, each of which possesses its own appendages as in the more developed types of the section.

The male is about 5 lines long, and the female nearly 10, exclusive of antennæ.

The specimens of this insect figured by Mr. Sowerby were caught by Mr. T. W. Simmons entangled in nets off Dysart, near Inchkeith.

Its appearance is so remarkable that the head may often be mistaken for the tail, especially if the antennæ are hidden. Sometimes it assumes the appearance of a tumbler or posture-master; and at times the abdomen is recurved beneath the thoracic portion.

The eggs are red, and adhere to the underside of the largest segment of the body.

Of its habits we are entirely ignorant, as well as of its motions, which, from the peculiar formation of the legs, must be curious.

DESCRIPTION OF PLATE IX.

Fig. 1. *Arcturus longicornis* ♂, magnified. The two outlines below exhibit the natural length of the male and female (the former being the smaller). 2. One of the inner antennæ. 3. The extremity of one of the outer antennæ. 4. The lip. 5. One of the mandibles. 6. One of the inner maxillæ. 7. One of the second maxillæ. 8. The outer lobe seen in another position. 9. One of the foot-jaws. 10. One of the first pair of legs. 11. One of the six following legs. 12. One of the six posterior legs. 13. The front of the body seen sideways. 14. The large thoracic segment of the female seen beneath, showing the subthoracic pouch. 15. One of the ova, highly magnified. 16. The abdomen seen from beneath, with the outer valves of the respiratory apparatus closed. 17. One of the outer valves detached. 18. One of the external respiratory plates. 18 *a*. The same, more magnified. 18 *b*. One of the curved basal lateral appendages, still more magnified. 18 *c*. Part of one of the terminal feathered hairs. 19. One of the second pair of respiratory plates. 19 *a*. The same, more highly magnified. 20 and 20 *a*. One of the third pair of ditto. 21 and 21 *a*. One of the fourth pair of ditto. 22. One of the fifth ditto. 23. One of a pair of internal organs above described in the ♂, and supposed to be connected with the organs of generation.

XVII. *On the apparent Identity of* Sphinx Ephemeræformis *of Haworth, with* Psyche plumifera *of Ochsenheimer.*

By J. F. Stephens, *F.L.S. Z.S., V.-Pres. Ent. Soc., &c.*

[Read June 2, 1834.]

PLATE X. Fig. 1.

What is *Sphinx Ephemeræformis* of Haworth?—is an inquiry which has been repeatedly, but fruitlessly, made during the last thirty years; an inquiry rendered more interesting from the very peculiar characters which have been assigned to the insect in question,—characters[*] totally at variance with those which distinguish any insect of the group in which it has been placed. One of our colleagues has published an essay, containing some ingenious and singular theoretical views, in order to investigate the identity, and the place in nature, of *Sphinx Vespiformis* of Linnæus (*Ægeria asiliformis* of English writers); but I shall content myself with a short paper only, unshackled by theory, with a view to identify the insect now under consideration, and to assign it to its proper location in the system.

This insect, rendered thus conspicuous from having been described in a slightly mutilated state, has by chance fallen into my possession, having recently obtained it at an auction of some of Mr. Donovan's insects, in the sale catalogue of which it was announced as an "undescribed *Cossus ligniperda*"!

By the assistance of my friend Mr. Westwood, I am enabled to present the Society with a figure of this unknown (for so it may justly be termed) insect, which, upon the most cursory inspection, proved to be no *Sphinx*, nor even to belong to that section of which *Sphinx* is the type, but to the singular group known by the name of "*Sackträgers*"[†] by the Germans, and considered by some writers as belonging to another order of insects[‡]: in fact, it appears to be a *Psyche* of Ochsenheimer—(*Ps. plumifera*)—so far as can be ascertained by the remains of the unique specimen described in *Lepidoptera Britannica*, p. 72, by the following short characters:

> "Antennis pectinatis, apice setaceis, alis fenestratis venis fusco-lutescentibus, abdomine ezonato.
>
> "*Obs.* Magnitudo et statura Ephemeræ minoris."

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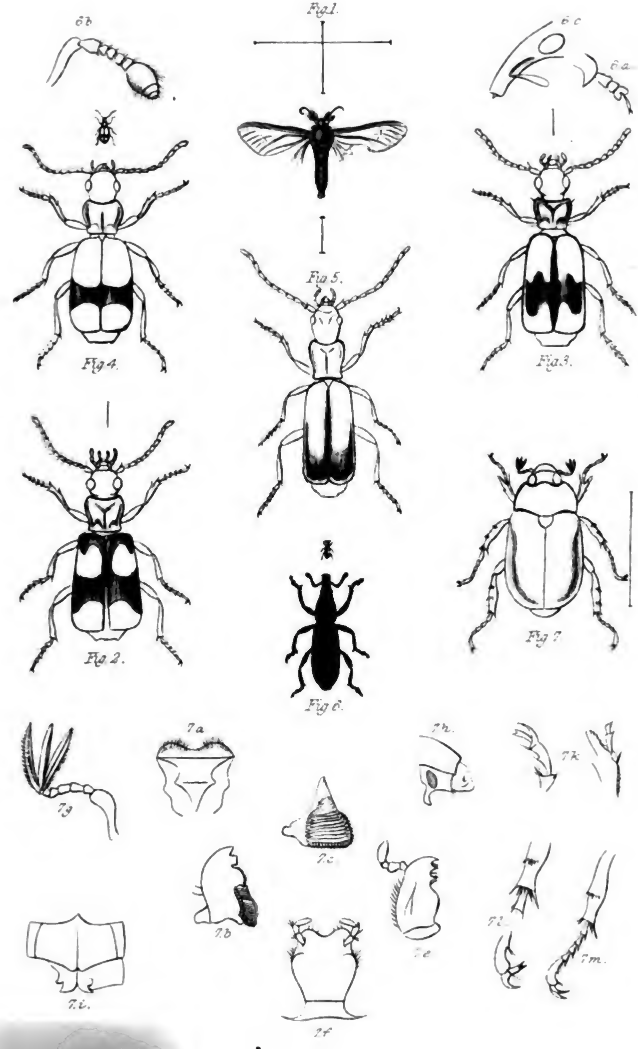
[*] "*Antennis pectinatis, apice setaceis.*"

[†] *Tineæ, Canephoræ*, Hübner.

[‡] Mr. Newman, in the essay above referred to, places them with the *Trichoptera*; Scopoli places two species with *Phryganea*; and Poda one with *Tenthredo*.

Trans. Ent. Soc. Vol. I. Pl. X



J.O.W. del.

G.B. Sowerby Jun. sc.

An examination of the accompanying figure will at once show the correctness of the above concise description, drawn up, as my lamented friend Haworth assured me, at the period of Drury's sale, at which the insect was purchased by Donovan; since when it has been hidden from view, till the mutability of human possessions once more brought it into light: but, at the same time, it is manifest that its location is not amongst the *Ægeriidæ* (see *Æg. formiciformis*, the insect next to which it is placed in *Lepidoptera Britannica*, p. 72.), the structure of the antennæ, neuration of the wings, &c. being dissimilar; neither has it any alliance with *Zeuzera*, to which genus it would appear Donovan assigns it, the sole resemblance thereto arising from the apparent simplicity of the tip of the pectinated antennæ; the neuration of the wings in *Zeuzera* and its congeners being totally unlike, the discoidal areolet being singularly intersected with nervures, whereas, in the insect now under examination that areolet is simple; the only resemblance being that the first posterior nervure is bifid in both insects.

From the mutilated state of the insect it would be mere waste of time to attempt an amended description of the specimen; I shall therefore merely add, that upon examining it, with reference to its genus, by inspecting the antennæ, it was palpable that the latter had been injured, and that the pectinations had been partly destroyed; but I am not positive whether or no the extreme apex might not originally have been simple, as in *Stauropus Fagi* ♂, several of the male *Geometridæ*, &c. The antennæ may be described as being rather long, and simply pectinated on each side, the pectinations *apparently* extending nearly to the apex; the thorax is broad, ovate, robust; the anterior wings long and narrow, rounded behind, with rather strong nervures, and hyaline; the posterior abbreviated and small; the abdomen long, robust at the base, and gradually attenuated to the apex; so that its discrepancies from *Psyche* are sufficiently great to remove it from the same genus: in *Psyche* the antennæ are short, curved, with short, twisted pectinations, extending evidently to the apex; the thorax slender; the abdomen linear, attenuated merely at the apex; the anterior wings broad, subtruncate on the hinder margin, with slender nervures; the posterior elongate and ample; but in both insects all the wings are nearly diaphanous, but mostly so in the *Ephemeræformis*. I therefore propose to distinguish the latter as a genus by the name

THYRIDOPTERYX,

Hübner's genera of the *Canephoræ* being all named from the peculiarities in the wings; and shall conclude by quoting Ochsenheimer's characters of the insect which appears to be synonymous with it; but as I cannot sufficiently decipher his German description, I cannot be positive that the two insects are identical. Ochsenheimer* says: "Ps. alis angustis hyalinis, corpore atro hirsuto, antennis plumosis."

Upon this last character there exists considerable doubt; and what may be the real colour of the body it is impossible to state, but the wings appear to agree. Of Ochsenheimer's insect (which appears to have been taken in Portugal,) I have not seen a specimen; the English one was found by Mr. Bolton in Yorkshire upwards of fifty years since.

It may be added, that the first notice of this insect was given by Mr. Haworth in his *Prodromus Lepidopterorum Britannicorum*, p. 35. as a new species, under the name of *Tinea fenestrella*, associated with the species of the genus *Fumea*; but at the period of the publication of that work (1802), *Psyche fusca*, its nearest ally, had not been detected in Britain.

XVIII. *Notice of the Habits of* Odynerus Antilope. *By* J. O. WESTWOOD, *F.L.S., &c.*

[Read June 2, 1834.]

I BEG leave to offer to the Entomological Society a notice of some facts which I have recently observed relative to the habits of *Odynerus Antilope*, and which seem to present another exception to the theory of M. St. Fargeau respecting the œconomy of the fossorial *Hymenoptera*, as well as to throw some light upon the mode of employment of the legs in the construction and provisioning of the nest, both which subjects, it will be remembered, have already upon several occasions occupied the attention of the Society.

It has been long known that the species of *Odynerus* form their nests in the old mortar of walls or in sand-banks, and that each of these nests is provisioned with about ten or twelve caterpillars, which are arranged in a spiral direction.

Some exceptions as to situation are mentioned in Curtis's Brit. Ent., and in the Mag. Nat. History.

Yesterday morning, 31st May, 1834, in walking at the side of an old brick wall, exposed to the sun, I noticed several specimens of

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* Vol. iii. p. 176.

Odynerus flying about, settling on the wall, and creeping into the holes which abounded in the rotten mortar. This induced me to watch the spot, in the hope of securing a few good specimens for my cabinet, which possessed only a broken example of the insect. I soon, however, observed what was to me of far greater interest. One of the wasps flew down with something held beneath the whole length of her body, which she succeeded in carrying into her burrow: another soon appeared, which I endeavoured to catch, in order to discover what the burthen consisted of; but the insect was too quick for me, unprovided as I was with entomological traps; and with that solicitude which marks all the proceedings of these creatures in the construction of their nests, she wheeled upwards to a considerable height, and made a circuit of several minutes' duration, and again attempted to reach her hole, which I again prevented by unsuccessfully attempting to knock her down with my pocket-handkerchief, when she soared away, and did not again return. I was, however, more fortunate with another, which I allowed to settle on the wall, and caught as she was creeping with her prey into her burrow: this consisted of the green caterpillar of a *Crambus* (?) which is about the length of the insect's body, and which I noticed was held by the hind legs of the *Odynerus*, and consequently extended from the head to the extremity of the abdomen of the latter. Hence the *Odynerus* is essentially a fossorial Hymenopterous insect, furnishing its nest with larvæ, and yet neither the anterior nor posterior legs are armed with those very remarkable spines* which characterize those real fossorial *Hymenoptera* which provision their own nests. Here, therefore, we have another exception to the theory of M. St. Fargeau in addition to those observed by Mr. Shuckard.

It may be said, indeed, that this instance ought not to be brought forward against the veteran French author, in as much as the insect belongs to the *Diploptera* or *Vespidæ*, and not to the *Fossoria* or *Sphegidæ*; but when we look at the ends in view, namely, the construction of a nest by burrowing, and the provisioning it with living insects, we are surely warranted in expecting that, if the theory were correct, *Odynerus* and *Sphex* would be similarly organized.

In this point of view we also necessarily arrive at the conclusion, that it will be expedient to place the theory of M. St. Fargeau even within narrower limits than those suggested by Mr. Shuckard, since some of the *Odyneri* burrow in sand, and are yet destitute of spines.

Some of the *Odyneri* which I noticed yesterday were employed in carrying a round pellet under the breast, larger than the head of the insect; I was, however, unable to catch one of these, but have no doubt that this consisted of the clay or earth with which the insect lines its cell, and which presents another proof of the necessity for spines on the fore legs were the theory above mentioned correct.

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* The joints of the anterior tarsi of the females are very slightly produced at the lateral extremity, forming several teeth.

On examining some of the specimens which I captured, I found they were males. I had noticed that some of the *Odyneri* flew about the walls very leisurely, and as though they were quite unconcerned in the construction of the nests; and it is most probable that these were the males.

I also noticed a great numer of *Chrysides* flying about the walls and entering into the different holes, evidently for the purpose of depositing their own eggs in the nests of the *Odyneri*. They were of different sizes, from the largest to a very small size, and I have little doubt were all varieties of the same species, *C. ignita*. When on the wing, the antennæ are stretched forward, with the extremities bent downwards. I also observed that the *Chrysides* kept flying about in the midst of the *Odyneri*, which did not seem to be in the least aware of the intentions of their companions, nor to offer them any molestation.

XIX. *Observations on certain Species of the Genus* Dromius. *By* CHARLES C. BABINGTON, *M.A., F.L.S., &c.*

[Read July 7, 1834.]

HAVING long turned my attention to the genus *Dromius*, I now beg leave to submit to the Entomological Society a few observations on some of the species included in it. I have endeavoured more particularly to unravel the confusion that has occurred in the works of our English entomologists amongst the species included by Fabricius under the name of *Carabus fasciatus*. I have also ventured to alter the characters of some of the other species, in the hope of making their specific distinctions more apparent. I must be allowed to add, that the thanks of the Society are due to my friend Mr. Westwood for the drawings which accompany this paper, he having kindly offered to employ his pencil in its illustration.

St. John's College, Cambridge,
June 1, 1834.

1. D. agilis, *Dej.*

Oblongus; capite thoraceque ferrugineis aut fuscis, thorace quadrato: elytris fuscis, disco duplici serie punctatis; antennis pedibusque testaceis.

Longitudo corporis 3, latitudo 1 lin.

D. agilis. *Dej. Spec. Col.* i. 240. *Steph. Ill.* (M.) i. 21. *Aud. et Brullé. Hist. Ins.* iv. 185.

Car. agilis. *Fab. Syst. Eleut.* i. 185.

Leb. agilis, var. *a.* *Gyll. Ins. Suec.* ii. 184.

Car. 4-maculatus, var. *d. e. g.* *Sch. Syn. Ins.* i. 218.

β. Car. atricapillus. *Panz.* xxx. *f.* 9.

Leb. agilis, var. *b.* *Gyll. Ins. Suec.* ii. 184.

γ. D. fenestratus. *Steph. Ill.* (M.) v. 367. *Steph. Nom. ed.* ii. *col.* i.

Car. fenestratus. *Fab. Syst. Eleut.* i. 209.?

Car. arcticus. *Oliv.* iii. 97. *t.* 12. *f.* 145.

Leb. agilis, var. *e.* *Gyll. Ins. Suec.* ii. 184.

Car. 4-maculatus, var. *c.* *Sch. Syn. Ins.* i. 218.

Oblong; *head* and *thorax* reddish, the latter nearly square, rather narrower behind, with the hinder angles somewhat prominent; *elytra* dark brown, with two series of slightly impressed dots upon each, one between the 2nd and 3rd, and the other between the 7th and 8th striæ from the suture.

In *var. β.* the head is dark brown.

Var. γ. has a pale reddish spot on the anterior part of the elytra, and sometimes one at the apex; the head also is dark. I cannot suppose this variety to be the *C. fenestratus*, Fab., which, from all the continental specimens that I have seen, from his description, and from the figure in Sturm's *Deuts. Faun.* vii. *t.* 168, appears to have a truly fenestrated spot nearly in the centre of each of the elytra, and to be a perfectly distinct species. I have no doubt that the insect described by Mr. Stephens, as quoted above, is only a variety of *D. agilis*, as I have captured specimens of this species which, when alive, had a pale mark such as he describes, but after death could hardly, if at all, be distinguished from the other specimens taken in their company.

This insect is not uncommon under the bark of trees.

2. D. meridionalis. *Dej.*

Oblongus; capite thoraceque ferrugineis aut fuscis, thorace transverso, angulis posticis rotundatis; elytris fuscis, linea e punctis parvis impressis; antennis pedibusque testaceis.

Long. 3, lat. 1 lin.

D. meridionalis. *Dej. Spec. Col.* i. 242. *Steph. Ill.* (M.) i. 16.

Car. agilis. *Panz. Faun.* lxxv. *f.* 11.?

This insect very much resembles *D. agilis*, but may always be distinguished from it by the characters given above.

The thorax is rather broader than long, narrower behind, and has the hinder angles less prominent. The elytra have only one series of punctures upon the disk of each, *i. e.* on the 6th stria from the suture.

A variety is sometimes found at Cambridge with the centre of each elytron ferruginous.

This insect does not appear to be rare, but is generally confounded with *D. agilis*. A good many specimens have occurred at Cambridge, and it is probably pretty generally distributed throughout this country.

3. D. quadrimaculatus. *Dej.*

Oblongus; capite nigro; thorace subquadrato, angulis posticis rotundatis, rufo; elytris fuscis, maculis duabus, altera prope basali, altera terminali; antennis pedibusque pallidis; subtus piceus, pectore rufo.

Long. 2⅓—3, lat. 1 lin.

D. 4-maculatus. *Dej. Spec. Col.* i. 239. *Steph. Ill.* (M.) i. 21. *Aud. et Brullé, Hist. Ins.* iv. 188.

Car. 4-maculatus. *Linn. Syst. Nat.* ii. 673. *Faun. Suec.* 809. *Fab. Syst. Eleut.* i. 207. *Sch. Syn. Ins.* i. 217. *Marsh, Ent. Brit.* 459.

Head black; *mouth, palpi*, and *antennæ* pale ferruginous; *thorax* quadrate, a good deal contracted behind, and the angles rounded, red; *elytra* with the humeral angles rather prominent, nearly rectangular, with the angular point rounded, brown, having two pale spots on each; one large oblong placed near the base and extending nearly to the middle; the other smaller transverse, sometimes wholly covering the apex, at others leaving a narrow dark line on the suture and external margin. In some varieties the spots on the elytra join, and in others the apical one is nearly or totally wanting.

Common under the bark of trees and in moss, but the varieties are rare.

4. D. quadrinotatus. *Dej.*

Elongatus; capite nigro; thorace subquadrato, postice attenuato, angulis posticis prominentibus; elytris fuscis, maculis duabus, antennis pedibusque pallidis; subtus piceus.

Long. 1⅓—2, lat. ⅓—¼ lin.

D. 4-notatus. *Dej. Spec. Col.* i. 238. *Steph. Ill.* (M.) i. 21. *Aud. et Brullé, Hist. Ins.* iv. 189.

Car. 4-notatus. *Panz. Faun. Germ.* lxxiii. 5. *Sch. Syn. Ins.* i. 221.
Leb. fasciata, var. *b*. *Gyll.* ii. 190.
Leb. 4-notata, var. *b*. *Gyll. Ins. Suec.* iv. 459.
Car. puncto-maculatus. *Marsh, Ent. Br.* 460.
β. Steph. Ill. (M.) i. 22. *t*: 1. *f*. 4.

Oblong; ***head*** black; ***mouth, palpi,*** and ***antennæ*** pale testaceous; ***thorax*** dark brown, rather elongated, narrowed behind, with the hinder angles acute prominent; ***elytra*** brown, faintly striated, having two pale spots, one large and nearly oval at the base, the other small and placed near to the extremity of the suture; ***body*** beneath dark brown; ***legs*** pale.

In *var. β.* the elytra are more deeply striated, and slightly punctate, the base nearly quite pale, and the apical spot very small; the antennæ and legs are redder.

This insect does not appear to be uncommon under the bark of trees and in moss; the variety occurs in company with the type, but not near so frequently.

5. D. fasciatus. *Dej.*

Niger; thorace subquadrato, ferrugineo aut piceo; elytris substriatis, angulis humeralibus rotundatis, antice pallidis postice fuscis, maculis apicalibus pallidis; subtus piceus.

Long. 1¼, lat. ½ lin.

D. fasciatus. *Dej. Spec. Col.* i. 238.; *Iconogr. t.* 12. *f.* 1.* *Steph. Ill.* (M.) i. 24. *Curt. Brit. Ent. fol.* 231. *Aud. et Brullé, Hist. Ins.* iv. 189.

Carabus fasciatus. *Payk. Mon.* 97. 60. *Faun. Suec.* i. 149. *Fab. Ent. Syst.* i. 139. *Syst. Eleut.* i. 186. *Schön. Syn. Ins.* i. 189. *Panz. Faun. Germ.* i. 366.?

Lebia fasciata. *Gyll. Ins. Suec.* iv. 459. *et etiam, ut mihi videtur,* ii. 189. *exclud.* var. *b.*

β. Dr. notatus. *Steph. l. c. p.* 24. *Curt.* 231. "Long. 1¾—2 lin." (*Steph.*)

Head black; ***thorax*** quadrate, narrowed behind, fusco-ferruginous or piceous; ***elytra*** gradually widening from the base, pale, with a dark angulated transverse fascia behind the middle and prolonged on the outer margins to the extremity, the suture also dark, leaving, therefore, two pale patches at the end of the elytra; *antennæ* and *legs* pale; *abdomen* dusky beneath.

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* It may be as well to observe, that persons using Dejean's Iconographie must trust to the descriptions, and not the figures, as the latter are done in such a manner as only to give a general idea of the respective insects, and not their specific characters.

D. notatus of Stephens does not appear deserving of distinction as a species; "its chief differences consist in its superior size and deeper colour." Gyllenhal in his Appendix has described an insect, under the name of *L. fasciata*, which he appears to think different from that to which the same name is given in his vol. ii. p. 189, and which latter he now calls *L.* 4-*notata*. This last may probably be referred to *D. notatus*, Steph., as I can only find that it differs from *L. fasciata*, Gyll., in its darker colour.

Taken at Southend, in Devonshire, and at Berwick-upon-Tweed.

6. D. bifasciatus. *Perroud.*

"Capite nigro; thorace quadrato, rufo; elytris substriatis, fuscis, maculis duabus magnis, altera humerali, altera postica lunata; antennis pedibusque pallidis; subtus piceus.

"Long. 1½: lat. ½ lin." *Dej.*

D. bifasciatus. *Dej. Spec. Col.* i. 237.; *Iconogr. t.* 11. *f.* 8.—not of *Steph. Nomenclature, ed.* 1 or 2.

Much resembles *D.* 4-*signatus*, but is a good deal less; the band on the elytra is dentate in the middle both anteriorly and posteriorly; it is a little narrower and more straight, and is dilated both ways on the outer margin, so as anteriorly almost to join the triangular patch at the base, and posteriorly along the outer margin until it joins the extremity of the dark suture, so as to form one spot upon each elytron; the *breast* and *abdomen* beneath dark brown, almost black; *legs* and *antennæ* pale.—*Dejean.*

Found in France; but not yet, as far as I can learn, in England, Mr. Stephens's specimens being *D. bipennifer.*

7. D. quadrisignatus. *Dej.* Plate X. Fig. 2.

Pallidus; capite nigro; thorace quadrato, rufo; elytris basi, sutura, fasciaque postica fuscis, angulis humeralibus prominentibus; subtus piceus.

Long. 2, lat. ¾ lin.

D. 4-signatus. *Dej. Spec. Col.* i. 236.; *Iconogr. t.* 11. *f.* 7. *Babington in Loud. Mag. Nat. Hist.* v. 328. *Steph. Nom. ed.* 2. *col.* 1.; *Illust.* (M.) v. 367. *Aud. et Brullé, Hist. Ins.* iv. 190.

D. sigma. *Steph. Nom. ed.* 1. *p.* 1.; but not of his *Illustrations*, nor of *Curtis's Guide* and *Brit. Entom.*

Head black; *thorax* quadrate, rufo-ferruginous, with the margins paler; *elytra* pale yellow, with the humeral angles prominent and nearly rectangular, at a little behind the middle a broad transverse brown fascia, dilated posteriorly on the outer margin, and connected at the suture with a triangular spot of the same colour at the base, the exterior angles of which are a little produced along the outer margins, so as to form an elongated patch on each side of the elytra; *apex* of the *suture* pale; *abdomen* piceous beneath, the *thorax* paler; *legs* and *antennæ* pale.

Taken at Cambridge by the Rev. A. W. Griesbach, J. A. Power, Esq., and myself; "in Lord Spencer's Park at Wimbledon, not at Dorking," by G. Waterhouse, Esq.; and at "Colney Hatch" by W. E. Shuckard, Esq.

8. D. sigma. *Dej*.

"Pallidus; capite nigro; thorace quadrato rufo; elytris substriatis," angulis humeralibus prominentibus, "sutura fasciaque postica dentata fuscis;" subtus pallidus.

"Long. 1¼, lat. ⅔ lin." *Dejean*.

D. sigma. *Dej. Spec. Col.* i. 235.; *Iconogr. t.* 11. *f.* 6. *Fisch. Entom. Ross.* iii. 87. *Steph. Ill.* (M.) i. 176.; not of Curtis's *Guide* or *Brit. Ent.*, nor of *Steph. Nom. ed.* 1., but *Steph. Nom. ed.* 2. *col.* i. *Aud. et Brullé, Hist. Ins.* iv. 190.

Car. sigma. *Rossi, Faun. Etrus.* i. 266. *no.* 564.? *Schön. Syn. Ins.* i. 226.?

Leb. fasciata. *Duft.* ii. 255.?

Head black; *mouth, palpi,* and *antennæ* pale yellow; *thorax* reddish, quadrate, a little contracted behind; *elytra* pale yellow testaceous, having the suture dark brown, that colour not extending to the base or apex, and a little behind the middle a broad transverse dark brown band, slightly dilated on the suture, dentated in the middle of each elytron anteriorly, and dilated posteriorly on the outer margins, along which last it sometimes extends almost to the extremity of the suture, when the posterior part of the elytra appears to form a rounded pale patch on a dark ground; underside of the *body* and *legs* pale yellow testaceous.

The above description is abridged from that given by Dejean, as I have not been able to obtain sight of a specimen.

The descriptions given by Rossi and Duftschmid are such as to agree with this species or *bipennifer*; that of Rossi will also include

Sturmii; but as they have omitted the width of their insects, it is quite impossible even to guess which is the species intended. All the synonyms given by Duftschmid belong to *fasciatus*. Fischer's description is copied from Dejean.

This insect has not as yet been discovered in Britain, all the recorded specimens being either 4-*signatus* or *bipennifer*, to the former of which the locality given by Mr. Stephens belongs.

9. D. bipennifer. *Babington*. Plate X. Fig. 3.

Capite nigro; thorace subquadrato, rufo; elytris substriatis, antice pallidis, angulis humeralibus rotundatis, sutura, et pone medium fascia subdentata, fusca, macula terminali pallida; corpore subtus, antennis pedibusque pallidis.

Long. 1½—1¾, lat. ⅓—½ lin.

D. bifasciatus. *Steph. Nom. ed.* 1. *p.* 1.; *ed.* 2. *col.* 2. *excl. syn. of Sturm.*

D. sigma. *Curtis's Guide, p.* 3.; *Brit. Ent. fol.* 231.

Elongated; *head* shining, black; *thorax* quadrate, narrowed behind, rufous; *elytra* obsoletely striated, with the humeral angles rounded, the base pale, suture dark, and behind the middle a dark transverse fascia slightly dentate in the middle of each elytron anteriorly and dilated posteriorly on the outer margins, but not to the apex, which is pale; *antennæ* and underside of the *body* pale.

This insect stands in the cabinet of Mr. Stephens under the name of *D. bifasciatus*, Dej., from which it differs in *not* having a triangular dark spot at the base of the elytra, the fascia not dilated anteriorly on the outer margins, and the underside of the body pale.

It is very nearly related to *D. sigma*, under which name it appears in the cabinets of Mr. Curtis and others, from which species it differs totally in size, (bearing the same proportion to *D. sigma* as *D. bifasciatus* does to *D.* 4-*signatus*,) that species being much wider in comparison with its length, and by having the humeral angles of the elytra rounded instead of being nearly rectangular, as I believe them to be in that species, which Dejean describes as agreeing exactly in form and size with 4-*signatus*, and also somewhat in form with 4-*maculatus*. It also appears to have been confounded with *D. sigma* by the continental entomologists, and probably by Dejean himself, as it has been received under that name from various parts of Europe by the Rev. F. W. Hope, to whom I take this opportunity of returning thanks for his kindness in granting me the use of his specimens of this and other species of *Dromius*.

Taken at Whittlesea Mere, Hunts, and sent from the North of England to the Cambridge Philosophical Society; also at "Dorking, and on Cardew Mire near Carlisle," Mr. Curtis; and at "Aberistwyth," Rev. F. W. Hope.

10. D. Sturmii. *Babington.* Plate X. Fig. 4.

Capite nigro; thorace subcordato, truncato, rufo; elytris pallidis, angulis humeralibus rotundatis, pone medium fascia fusca, sutura pallida; corpore subtus, antennis pedibusque pallidis.

"Long 1¼ lin." *Stu.*

D. fasciatus. *Sturm, Deutsch. Faun.* vii. *p.* 43. *t.* 69. *f.* C.

Head black; *thorax* subcordate, rufous; *elytra* paler than the thorax, the humeral angles rounded, behind the middle a transverse fascia slightly dilated at the suture, and very much so at the exterior margins both anteriorly and posteriorly, suture pale; *antennæ, legs,* and underside of the *body* pale.

This insect I only know from the figure in Sturm's beautiful work above quoted; but as it is clearly a distinct species, I have ventured to describe it under the above name. It differs from *D. fasciatus* in having the suture and underside of the body pale, and from *sigma* and *bipennifer* by having the fascia on the elytra not dentate in the middle and dilated both ways on the exterior margins, and the suture pale.

Sturm's description will agree with either this species, *D. sigma,* or *bipennifer*: he says that it was found in Austria.

11. D. melanocephalus. *Dej.*

Pallidus; capite nigro; thorace quadrato; elytris immaculatis; abdomine ferrugineo.

Long. 1¼—1¾, lat. ¼—¾ lin.

D. melanocephalus. *Dej. Spec. Col.* i. 234.; *Iconogr. t.* 11. *f.* 5. *Steph. Ill.* (M.) i. 22. *t.* 1. *f.* 5. *Sturm. Deutsch. Faun.* vii. 44. *t.* 169. *f.* D. *Aud. et Brullé, Hist. Ins.* iv. 188.

Leb. linearis, var. *b. Gyll.* ii. 187.?

β. D. scutellaris. *Steph. l. c.*

Head black; *thorax* pale red, quadrate; *elytra* pale, very faintly striated; *antennæ* and *legs* pale; *body* beneath rather darker, particularly the abdomen.

Var. β. has a triangular dark spot surrounding the scutellum; the abdomen and tips of the antennæ brown.

A common species in gravel-pits, under moss, &c. The variety is more rare, but is found in company with the type.

12. D. linearis. *Oliv.*

Elongatus, fusco-ferrugineus; fronte striis plurimis longitudinalibus; thorace subcordato; elytris punctato-striatis, pallidioribus, postice infuscatis; antennis pedibusque pallidis.

Long. 2—2¼, lat. ⅔—¾ lin.

D. linearis. *Dej. Spec. Col.* i. 233.; *Iconogr. t.* 11. *f.* 4. *Sturm. Deuts. Faun.* vii. *t.* 169.? *Steph. Ill.* (M.) i. 25. *Aud. et Brullé, Hist. Ins.* iv. 187.

Car. linearis. *Oliv. Ent.* iii. 111. *t.* 14. *f.* 167. *Marsh. Ent.* i. 463.

Dusky ferruginous above; *thorax* rather paler than the head, quadrato-cordate; *head* with numerous longitudinal striæ between the eyes; *elytra* deeply punctate-striate, rather pale; body beneath ferruginous, with the abdomen darker.

Very common, as I believe, throughout England.

13. D. longiceps. *Dej.* Plate X. Fig. 5.

Elongato-linearis, pallide fusco-ferrugineus; thorace subquadrato; elytris striatis obsoletissime punctatis, sutura et macula communi subapicali cuneata nigris; antennis pedibusque pallidis.

Long. 3, lat. ⅔—¾ lin.

D. longiceps. *Dej. Spec. Col.* ii. 450.; *Iconogr. t.* 11. *f.* 3. *Babington in Lond. Mag. of Nat. Hist.* v. 327. *Steph. Ill.* (M.) v. 368.

Head with two oblique longitudinal punctate foveæ between the eyes; *elytra* with the suture dark, that colour gradually increasing in width till near the apex, when it is rounded off so as to leave the apex pale.

Taken in small quantity from the sedge-boats at Cambridge, in the spring, but not from moss, as it is incorrectly stated in the Mag. of Nat. Hist. and Steph. Illustr. It also occurs at Whittlesea Mere, Huntingdonshire.

XX. Thysanuræ Hibernicæ, *or Descriptions of such Species of Spring-tailed Insects* (Podura *and* Lepisma, *Linn.,*) *as have been observed in Ireland; by* R. Templeton, *Esq., R.A., Corr. Member of the Natural History Society of Belfast: with Introductory Observations upon the Order, by* J. O. Westwood, *F.L.S. &c.*

[Read June 2, and July 7, 1834.]

Introductory Observations upon the Thysanura, *by* J. O. Westwood.

My friend Robert Templeton, Esq., previously to his departure from England, placed in my hands, for the purpose of its being submitted to the Entomological Society, the following paper, containing descriptions of various species of Thysanurous insects which he had observed in Ireland, accompanied by numerous figures, allowing me to make such additional remarks thereon as appeared serviceable by way of introduction.

If we look at the *Thysanura* merely as an order of animals whose characters and distinctive peculiarities have hitherto been greatly neglected, the attempt to investigate their structure and specific differences could not fail to meet with approval; but there are other circumstances which render the group of insects in question more especially worthy of attention. Firstly, from the rank which they hold amongst annulose beings, being one of those *quæstiones vexatæ* which it is most desirable should be set at rest, and which it is natural to suppose can only be done by a series of minute investigations: thus, whilst Latreille and Leach consider these animals as true insects, Mr. MacLeay removes them far asunder, and places them with the Centipedes, Worms, and Lice in his class *Ametabola*.

In the next place, these insects offer a very valuable field of inquiry from the great modification which the various parts of the mouth undergo in the different groups, and which, when thoroughly investigated, may perhaps lead to the solution of those interesting questions respecting the real analogies of the parts of the mouth amongst the *Myriapoda*, *Arachnida*, and *Crustacea*, respecting which at present scarcely any two entomologists are agreed.

In some of these animals we find a development of the trophi as great as in some of the most perfect of mandibulated insects; whilst in others the mouth is so obscurely organized that neither Latreille nor Savigny has been able to trace its formation.

Other portions of the structure of these insects are not less interesting. The simple construction of the eyes, formed of a few ocelli alone in some of these insects, as in the *Iulidæ*, whilst in others they are short and perfectly reticulated;—the composition of the body, as in the typical *Annulosa*; but more especially the beautiful scales with which the body is covered, and the singular apparatus with which the tail is furnished, whereby the insect is enabled to leap to very considerable distances, and especially the peculiar organs with which the underside of the abdominal segments are furnished, and which being evidently the analogues of the false legs of the *Scolopendra*, prove the near approach made by these animals to the *Myriapoda*,—all deserve notice; but a more important peculiarity exists in the apparent want of spiracles along the sides of the body, and which Latreille, notwithstanding a very minute examination, was unable to discover.

There is still another circumstance which renders these insects especially interesting to the naturalist in general, resulting from those principles of natural arrangement which Mr. MacLeay has laid down in the 'Horæ Entomologicæ'. Thus, if we consider those annulose animals which are the least perfectly organized as forming a distinct class, containing within itself types not only of the other great divisions of the class, but also of each of the various subdivisions, we shall find the *Thysanura* holding an important place with respect to the distribution of the *Annulosa* in general. Thus they have been regarded by Mr. MacLeay as determining the situation of the *Orthoptera* amongst mandibulated insects, and of the *Amphipoda* amongst the *Crustacea*, on account of the saltatorial powers possessed in common by these different groups, and the setiform appendages of the tail. So in the groups into which the different orders are divided, *Ichneumon, Gryllus, Perla, Tenthredo*, and *Panorpa* are placed in analogous connexion, on account of the caudal appendages which they possess in common with the *Thysanura*.

In like manner, in the distribution of the *Coleoptera* into five groups, one of them is regarded as analogically representing the *Thysanura*, on account of the abdominal appendages of the body, although this group is but very slightly defined; whilst in the *Lepidoptera* Dr. Horsfield, by applying the same principles, has considered such genera as *Apatura, Paphia, Hipparchia*, &c. as analogically representing the *Thysanura*, especially in consequence of the two very strongly marked lengthened filiform or spinous appendages with which the abdomen of the larvæ is furnished.

And the same principle has been carried to a still further extent by Mr. Swainson in his 'Zoological Illustrations,' in which work it is to be observed that the name of the order is invariably misspelt *Thrysanura.*

We are indebted to Latreille for a very valuable memoir upon this order, published last year in the first volume of the 'Nouvelles Annales du Muséum d'Histoire Naturelle', in which the most ample details are given relative to the structure of the different groups. He has not, however, given descriptions of the numerous species of the *Poduridæ.* This blank has in part been filled up by Mr. Templeton.

It is to be regretted that even in this small group confusion has arisen in the nomenclature of the genera, resulting, as is so repeatedly the case, from proper regard being neglected to be paid to those particular species which constitute the types of the genera as originally constituted.

It is evident that the *Forbicina* of Aldrovandus was intended for the *Lepisma saccharina* of Linnæus. Geoffroy, although aware of this, sunk the Linnæan generic name *Lepisma,* and adopted that of *Forbicina,* adding a second species, *la Forbicine cylindrique.* Latreille, adopting the Linnæan name of *Lepisma* for the *saccharina,* properly considered that as *Forbicina* was evidently synonymous therewith, it would be improper to employ it even for Geoffroy's second species, to which he accordingly gave the name of *Machilis.* He, however, referred Geoffroy's species to the *Lepisma polypoda* of Linnæus, a step which, from the description of Dr. Leach, would appear to be incorrect. The last-named author, by sinking Latreille's name of *Machilis* and adopting Geoffroy's *Forbicina,* acted, as it seems to me, neither with correctness nor respect to his friend Latreille. He described the genus as having the antennæ shorter than the body, giving the *Lepisma polypoda* of Linnæus, and yet gave as synonymous the *cylindrique* of Geoffroy, who expressly says that these organs are longer than the body.

He likewise established another genus, *Petrobius,* upon a species found upon our coasts.

Latreille, however, in the memoir above noticed, considered the latter as not sufficiently distinguished from the other species of *Machilis,* which he divided into two sections: 1st, with antennæ longer than the body, including the *Forbicine cylindrique* of Geoffroy, under the new name of *Machilis annulicornis,* and the *Petrobius maritimus* of Leach; and, 2ndly, those with antennæ shorter than the body, including the species figured in his 'Genera Crustaceorum', and which he regards as the *Forbicina polypoda* of Leach, but doubts whether it be the *polypoda* of Linnæus*.

* I had hoped to have been enabled to clear up this doubt by an examination of the Linnæan specimens; but notwithstanding a careful and repeated search through

For want of specimens I have been unable to make such a minute examination of these insects as would enable me to speak upon the propriety of Latreille's entirely sinking the *Petrobius* of Leach; but I may be allowed to observe, that the littoral habits of that group seem to give it as great a claim to be considered distinct from the others, as that which separates the *Nebriæ* and *Helobiæ*, or *Bledius* and *Hesperophilus* amongst the *Coleoptera*.

Descriptions of the Irish Species of Thysanura, *by* R. TEMPLETON, *Esq.*

INSECTA.—AMETABOLIA, *Leach.*

THYSANURA, *Leach.*

LEPISMADÆ. *Leach.*

LEPISMA, *Linn.*

Sp. 1. SACCHARINA, *Linn.*

Common, *John Templeton.*

FORBICINA, *Geoff.*

Sp. 1. POLYPODA, *Linn.*

Plate XI. Fig. 1.

Very common in dry stone ditches and mossy places.

Fig 1. Outline of the animal magnified. 1 *a*. Head seen in front. 1 *b*. Superiorly. 1 *c*. Antenna. 1 *d*. Last joint of the palpus. 1 *e*. The fore leg. 1 *f*. The hind foot. 1 *g*. Jaws, which are very thin and membranous. 1 *h*. Inside, showing the auxiliary legs; the back is placed to the right. 1 *i*. The auxiliary foot, with which it ascertains the presence of the object against which the tail is adpressed. 1 *k*. A scale, much magnified, to show the lines producing the iridescence, from 9,000 to 11,000 in an inch.

PETROBIUS, *Leach.*

Sp. 1. MARITIMUS, *Leach.*

Common everywhere on our rocky shores.

PODURADÆ, *Leach.*

ORCHESELLA, *n. g.*

Antennæ 6- or 7-jointed, nearly as long as the body, filiform; *fork* developed.

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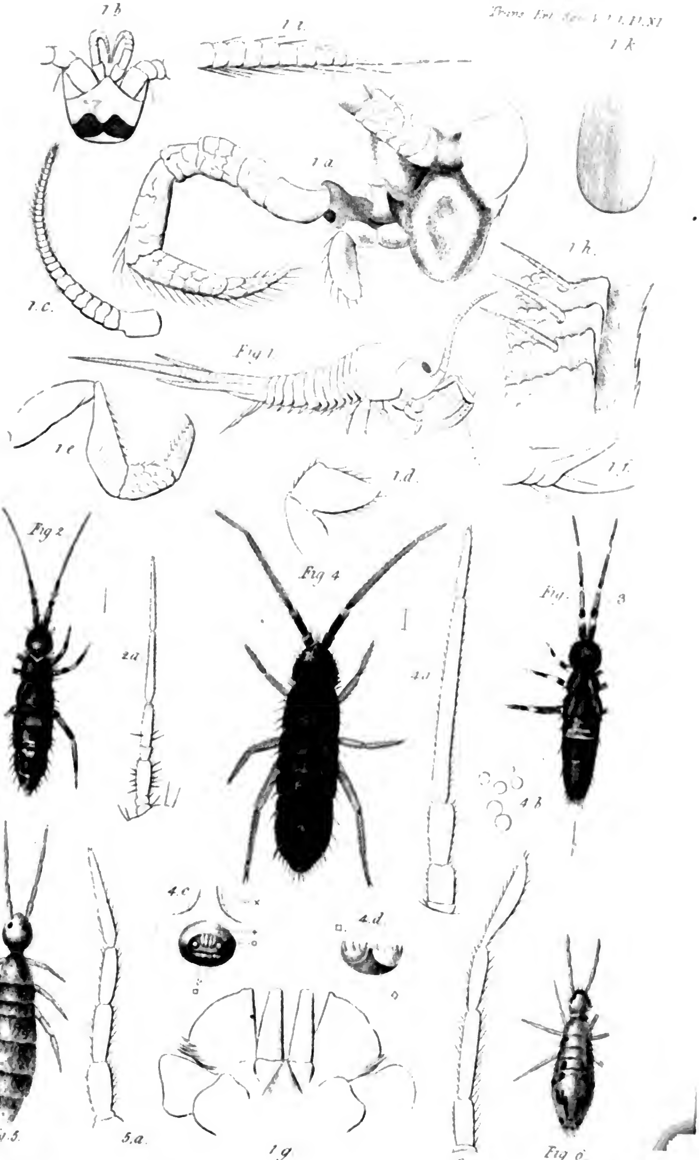
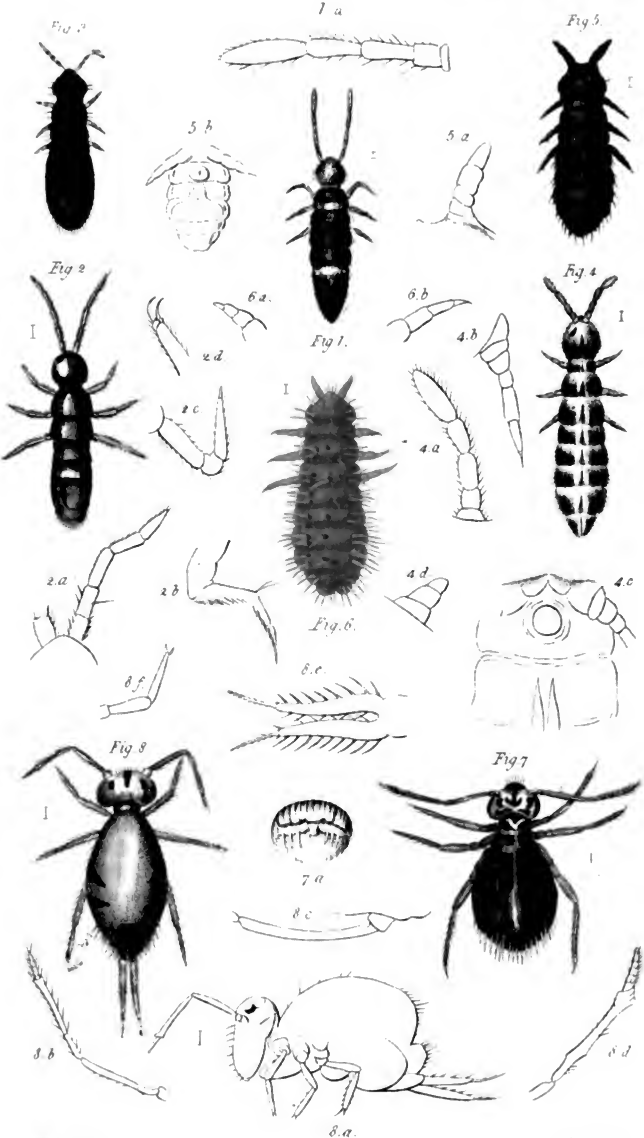
the Linnæan cabinet, I have not been able to find a single species of the order. Mr. Templeton's species, which he names *polypoda*, enters into the second section, and is evidently identical with Dr. Leach's *polypoda*.



R.T. delt

J. Swaine sc.



R. T. delᵗ

J. Swaine sc.

Sp. 1. Orchesella filicornis.

Plate XI. Fig. 2.

Head globular, a little flattened at the sides, black, a brownish patch posteriorly on the vertex and towards the neck. First 4 joints of the *antennæ* with black bases and white tips; 5th dark brown towards the apex, remaining joints pale, long, subequal, with minute hairs. *Thoracic rings* very hairy or spiny, especially towards the neck, including between the brownish green centres and the black margins irregular white maculæ. *Abdominal rings* not as hairy as the preceding; 1st pale greenish posteriorly, edges black, and parallel black lines at the anterior angles; 2nd jet black, except at the extreme lateral margins, and a narrow pale line posteriorly; 3rd pale, with a black square macula and two included white specks; 4th black, a triangular green space posteriorly, last ring green. *Legs* pale greenish, annulated with black.

Length 0·16 inch.

Common at Cranmore.

The young have the maculæ brownish, and often interrupted.

Fig. 2. Insect magnified. 2*a*. Left antenna.

Sp. 2. Orchesella cincta (*vaga*, Fab.?).

Plate XI. Fig. 3.

Head globular, proportionably larger than in the preceding species; 1st, 2nd, and 3rd joints of the *antennæ* dark brown at the base, white at the apex; 4th intensely black, remaining joints reddish brown basally, with minute white apices. *Thoracic rings* intensely black, inclosing on each side an irregular longitudinal pale greenish patch. 1st *abdominal ring* pale greenish at the base, white at the apex, not so dilated as in the preceding species; 2nd and following *rings* intensely black, shining; *fork* white. *Legs* pale, annulated with brown.

Length 0·15 inch.

A few specimens at Cranmore.

Fig. 3. Insect magnified.

Podura, *Linn.*

Antennæ 4- or 5-jointed, longer than the head; *fork* developed.

Sp. 1. Podura plumbea, *Linn.*

Plate XI. Fig. 4.

Body elongate cylindric, thickly covered with purplish-blue scales, which when detached exposed the surface, of a golden yellow colour. *Head* subtriangular; cephalic joints of the *antennæ* blackish, with yellow apices; last two joints livid, densely covered with minute whitish hairs. A dense row of strong whitish hairs directed forwards encircles the neck; others are found irregularly scattered over the thoracic and abdominal rings; a tuft at the apex; beneath pale brownish. *Legs* yellow; *tarsi* pale translucent, of last pair purplish red.

Length 0·14 inch.

Extremely common.

Fig. 4. The insect magnified. 4*a*. Left antenna. 4*b*. Configuration of the left eyes. 4*c*. Represents the mouth; ×, the positions of the antennæ; +, a cylindric ring, moveable, and inclosing the manducatory organs; $^{\circ}$, the labium, transverse, striated longitudinally in the middle, and with a minute hemispheric tubercle laterally, closely adpressed against $^{\square}$ in the state of rest. 4$^{\square}$. The labrum fimbriated at its apex along the diameters of two convex semicircles placed on the basal part of the lip ○. There is no appearance of lateral pieces internally, or anything resembling maxillæ. These lips are moved to and fro with considerable rapidity, but seem to have little prehensile power, as they were unable to seize upon the minute hairs of the sable pencil which I passed into the mouth. A singular apparatus is protruded from the 1st abdominal ring beneath, which will be noticed under *Podura stagnorum*: it is common to all the *Poduræ*.

Sp. 2. PODURA NITIDA.

Plate XI. Fig. 5.

Body obovate, smooth, shining; *head* globular, a little produced anteriorly; *eyes* reddish brown. *Thoracic* and *abdominal rings* pale, with innumerable reddish brown streaks and spots, especially basally, and two or three strong hairs in the middle, a collar of similar hairs encircling the neck, and minute ones over the whole body. *Antennæ* and *legs* pellucid.

Length 0·09 inch.

Common at Cranmore in the grove.

Fig. 5. Insect magnified. 5*a*. Antenna of left side.

Sp. 3. PODURA NIGRO-MACULATA (*minuta*, Fab.?).

Plate XI. Fig. 6.

Body obovate, greenish or yellow, pale; *head* small, subtriangular, with a jet black fascia anteriorly including the eyes. *Posterior thoracic rings* a little mottled at the sides; *abdominal rings*, 1st and 2nd with a triangular black macula laterally near the apex; 3rd scutiform, large, broad, on each side of the middle line a tripod, arising at the apex and directed forwards; 4th ring with its anterior angles black; last minute, immaculate. *Legs* and *antennæ* pellucid, covered with minute hairs.

Length 0·06 to 0·08 inch.

Extremely common in the garden at Cranmore.

Fig. 6. Insect magnified. 6*a*. Antenna of left side, seen in profile.

Sp. 4. PODURA ALBO-CINCTA.

Plate XII. Fig. 1.

Body oval, black, covered with long hoary hairs. *Head* subglobular, rather large, whitish, a little obscured anteriorly. 2nd *thoracic ring* with its apical half white; 3rd *abdominal ring* with its basal half white. *Antennæ* and *legs* pellucid.

Length 0·04 inch.

Not uncommon at Cranmore, beneath tiles.

Fig. 1. Insect magnified. 1*a*. Antenna of left side.

Sp. 5. PODURA CINGULA.

Plate XII. Fig. 2.

Body cylindric, greenish, with brown sides. *Head* subglobular, truncate, posteriorly brown; *eyes* black. 2nd *abdominal ring* with a black base, the apical half white, shining. *Legs* and *antennæ* pale brown.

Length 0·05 inch.

A few specimens under a brick at Cranmore. This species will at some future period form the type of another subgenus.

Fig. 2. Insect magnified. 2*a*. Antennæ, the 1st joint extremely large. 2*b*. The profile of the fork. 2*c*. A leg. 2*d*. Tarsus and claws.

Sp. 6. PODURA FULIGINOSA (*grisea*, Deg.?).

Plate XII. Fig. 3.

Body subcylindric, greenish black. *Head* subtriangular. *Antennæ* not much longer than the head; joints nearly equal. 1st *thoracic ring* much larger than the succeeding; 3rd *abdominal* also very large; a black line down the middle of the back. *Legs* short, tapering, pale greenish.

Length 0·05 inch.

A few specimens at Cranmore, under the bark of a rotting tree.

Fig. 1. Animal magnified.

Sp. 7. PODURA STAGNORUM.

Plate XII. Fig. 4.

Body elongate obovate, pale. *Head* ovate; *eyes* black. *Antennæ* not much longer than the head. *Thoracic* and *abdominal rings* equal in length, pale, with a greenish transverse fascia occupying the posterior half of each ring, interrupted in the middle, an elongate triangle, with its base at the apex of each ring, occupying that part.

Length 0·05 inch.

In some varieties a double row of black points down the back.

Extremely common at Cranmore, on the surface of little pools of stagnant water. March 1808.

Fig. 4. Animal magnified. 4 *a*. The antennæ. 4 *b*. Leg. 4 *c*. The 1st and 2nd abdominal rings beneath, to show the position occupied by a singular erectile body, which is seen in profile when fully distended at fig. 4 *d*. The animal has the capability of jutting this out at pleasure; and in some species its head is swollen beyond the dimensions of the peduncle, and stands up between the extremities of the fork, so as to lead me at first to suppose that it was useful in the springing of the little animal, but I now believe it to be the external sexual organ; when retracting, the head is first drawn in, then each portion successively, leaving ultimately a little depression in the ring.

ACHORUTES, *n. g.*

Antennæ 4-jointed, shorter than the head; *fork* obsolete.

Sp. 1. ACHORUTES DUBIUS.

Plate XII. Fig. 5.

Body subcylindrical, purplish black, shining; *wings* tuberculate and with scattered spines. *Head* large, subtriangular, truncate anteriorly; *eyes* remote from the base of the antennæ, which have the two first joints very short, the succeeding long and not much contracted. *Apex* of the *abdomen* ending obtusely.

Length 0·03 inch.

At Cranmore, on water. It cannot leap. Can it be the young of *P. aquatica*, Linn.?*

Fig. 5. Animal magnified. 5 *a*. Antenna. 5 *b*. Under surface of the abdomen, showing the obsolete fork and the erectile process.

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* *Podura aquatica* is common enough in Ireland. I had not, however, an opportunity of examining it attentively before I left Cranmore; but I should have placed it under *Achorutes* as a third Irish species, had I not been startled by the description given by Lamarck, *An. sans Verteb.* vol. v. p. 21, "P. nigra, aquatica; antennis corporis *sublongitudine*"; and by the remembrance of the ease with which it leaps.

Sp. 2. ACHORUTES MUSCORUM.

Plate XII. Fig. 6.

Body subcylindrical, turned posteriorly, and ending with two mammillæ, dark purplish. *Head* short triangular; *eyes* not remote from the base of the antennæ, which are very short, and have the 1st joint very large, the succeeding successively diminishing in size; last acuminate. *Legs* pale blue. *Rings* with strong spiny hairs in rows along the back; *hairs* usually arising in pairs. Length 0·07 inch.

At Cranmore, under a rotting stick: it moves very slowly, and cannot leap.

Fig. 6. Animal magnified. 6 *a*. The antennæ. 6 *b*. A foot.

SMYNTHURUS, *Latr.*

Sp. 1. SMYNTHURUS VIRIDIS, *Fabr.*

Plate XII. Fig. 7.

Head yellow, anteriorly a brown mesial fascia ending in a transverse one at the vertex; posteriorly an irregular, broad transverse fascia. *Abdomen* subglobular, green, a pale mesial line ending in a black anal macula, and having two others contiguous, anterior to which is a 4-angular lightish patch, anteriorly bounded by irregular patches, ending in a dark transverse fascia; laterally dark green, mottled; near the neck two irregular transverse fasciæ, interrupted in the middle. *Antennæ* yellow at their base; *apex* darker brown. *Legs* pale brown, with darker coxæ. Length 0·06 inch.

Common at Cranmore among plum-tree leaves which have fallen to the ground.

Fig. 7. Animal magnified. 7 *a*. The mouth.

Sp. 2. SMYNTHURUS ATRA, *Fabr.*

I have never seen more than one specimen in Ireland: it appears very common in Britain.

Sp. 3. SMYNTHURUS SIGNATA, *Fabr.*

Plate XII. Fig. 8.

Head yellow, transverse, an abbreviated brown mesial fascia; *eyes* black. *Abdomen* greenish yellow, lozenge-shaped, with three triangular brown maculæ on the sides behind the middle, their apices directed inwards; above the anus an intensely black rectangular macula, from about which stands out a tuft of white hairs. Beneath this macula a process separated by a channel, hairy, and having a ferruginous triangle in its middle line.

Antennæ yellow at the base, ferruginous at the apex. *Legs* pale, hairy, with two claws.

Length 0·06 inch.

Extremely common at Cranmore in the autumn under the fallen leaves in the grove.

Fig. 8. Animal magnified. 8 *a*. Profile. 8 *b*. Left antenna. 8 *c*. 1st and 2nd joints of the same antenna. 8 *d*. Last 2 joints (3rd and 4th) of the right antenna, showing the hairs arising in circles, and giving it the appearance of being numerously jointed, which it is not. 8 *e*. The tails.

XXI. *Description d'un nouveau Genre de* Curculionites. *Par* M. A. Chevrolat, *Membre de la Soc. Ent. de France, &c.*

[Read July 7, 1834.]

Fam. CURCULIONIDÆ.

Microxylobius,

Genus novum Curculionidum *e divisione* Cossonidum, *Schh.*

Character Generis.

Antennæ crassæ, 10-articulatæ, ultra medium rostri insertæ; articulo 1mo (scapus) apice clavato, oculos attingente, funiculus 5 articulis; 2do conico; 3tio subtriangulari, 4—6 moniliformibus, clava ovata 4-articulata.

Rostrum capite longius, cylindricum, subarcuatum; scrobs obliqua, recta, infra oculos desinens.

Caput sub convexum, infrà gutturosum.

Oculi laterales, subdepressi, rotundati.

Thorax latitudine longior, subcylindricus, in medio perparum extensus, basi et apice truncatus circuatusque.

Scutellum nullum.

Elytra connata, subcylindrica, latescentia versus apicem, singulatim rotundata extremitate.

Pedes tot approximati; femoribus crassis inermibus; tibiis subarcuatis, apice unco recurvo armatis; articulo 1mo tarsorum conico, 2do brevi, 3tio bilobo, ultimo longo, biunguiculato.

Sp. 1. Micr. Westwoodii.

Pl. X. Fig. 6.

Nigro-æneus, glaber; capite rostroque punctulatis, thorace con-

stricto infra apice, elytris subrugatis, corpore subtus punctatissimo.

Long. corp. circiter lin. 1, lat. $\frac{1}{3}$ lin.

Ex museo Dom. Saunders.

Habitat Insulâ S^{ta} Helenâ.

Ce genre de *Coléoptère,* qui a quelques rapports avec certains *Baridius,* me parait devoir appartenir plutôt à la famille des *Cossones* : *trompe* deux fois aussi longue que la tête, un peu gibbeuse au dessus de l'insertion des antennes ; *téte* très gonflée dessous, un peu aplatie sur le front ; *corselet* deux fois et demi aussi long que large ; *elytres* de la largeur du corselet, allant en s'elargissant jusqu'à la marge extérieure, finement ridées en travers et marquées de quelques stries interrompues, la marge de la base est elevée ainsi que la suture : le dessous parait plus fortement ponctué que le trompe et la tête ; le corselet en dessous a une impression cintrée en avant des pattes ; les *cuisses* sont tres épaisses et arquées ; la *couleur* générale de cet insecte est d'un noir bronzé.

Mr. Westwood, qui a figuré avec grand soin, le petit Curculionite dont il s'agit, a souhaité, ainsi que le plupart des entomologistes de Londres, que j'etablisse les caractères de ce genre. Je leur en temoigne ici toute ma reconnaissance. J'ai pensé faire plaisir au savant et zèlé naturaliste leur compatriote en lui dediant cette espèce.

DESCRIPTION OF THE FIGURES.

PLATE X. Fig. 6.

Microxylobius Westwoodii magnified. 6*a.* Ditto, natural size. 6*b.* Antenna. 6*c.* Rostrum seen sideways. 6*d.* Extremity of tibia and tarsus.

XXII. *Descriptions of new Species of Indian Ants. By Lieut.-Colonel* W. H. Sykes, *F.R.S., &c.*

[Read August 6, 1834.]

I DEEM it necessary to preface my paper by stating that my friend Mr. Hope has been good enough to draw up the Latin specific characters of the following insects.

MYRMICA KIRBII, *Sykes.*

Plate XIII. Fig. 1.

♀ Aptera, ferruginea, antennis pedibusque rufis, squama petiolari, 2?-nodosa, abdomine fuscanti. Caput parvum; oculis nigris; antennis extrorsum increscentibus. Mandibulæ sublatæ intus 4-dentatæ. Labrum superius membranaceum, ciliatum. Thorax subquadratus, elevatus, postice spina brevi acutâ utrinque armatus. Abdomen antice latum, postice acutissimum, piceum.

♂ magnitudine præcedenti æqualis at pallidior et alata. Caput parvum, tribus stemmatis ornatum. Thorax niger et inflatus. Squama petiolaris brevissima. Abdomen parvum. Alæ corpore longiores.

Long. corp. $\frac{2}{10}$ unc.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

Neuter: Wingless, ferruginous. *Abdomen* of a darker colour, approaching to mahogany. *Head* half the size of the abdomen. *Eyes* two, large, black, consisting of a multitude of lenses: no false eyes. *Mouth* armed with two strong jaws, somewhat broad, nearly square at their ends, and each furnished with four minute teeth. No *palpi* discoverable with the highest power of a double French microscope. *Upper lip* membranaceous, fringed with a few hairs. *Antennæ* forming an elbow; lower joint the longest; upper joints setaceous, but obscurely club-shaped. *Thorax* of two segments, somewhat square, armed with a short, sharp-pointed brown spine on each side posteriorly. The insect when irritated carries the abdomen turned up and overshadowing the thorax, and the petiole lies as in a groove between these spines. *Petiole* of two joints or nodes. *Abdomen* broad at the petiole, terminating in a very sharp point, armed with a minute sting.

Length of insect $\frac{2}{10}$ths of an inch.

Male, size of neuter: winged. *Head* small; jaws smaller than in neuter; *thorax* larger, and inflated. No lateral spines. *Petiole* very short. *Abdomen* smaller than in neuter. *Wings* a little longer than the whole insect. *Antennæ* setaceous; lower joint shorter than the remainder. *Head* with three stemmata or false eyes. Insect of lighter colour than the neuter.

Queen: wingless, about half an inch long, of the size of a crow-quill, white, the swollen abdomen having the appearance of five or six ligatures like the queen of the white ants. *Head* small. *Legs* little more than rudiments. The whole insect has the appearance of a diminutive queen of white ants.

Eggs very minute, white, oblong, nearly transparent, having a longitudinal brown streak, which corresponds to the thorax of the future insect. The *larvæ* as they increase in bulk would

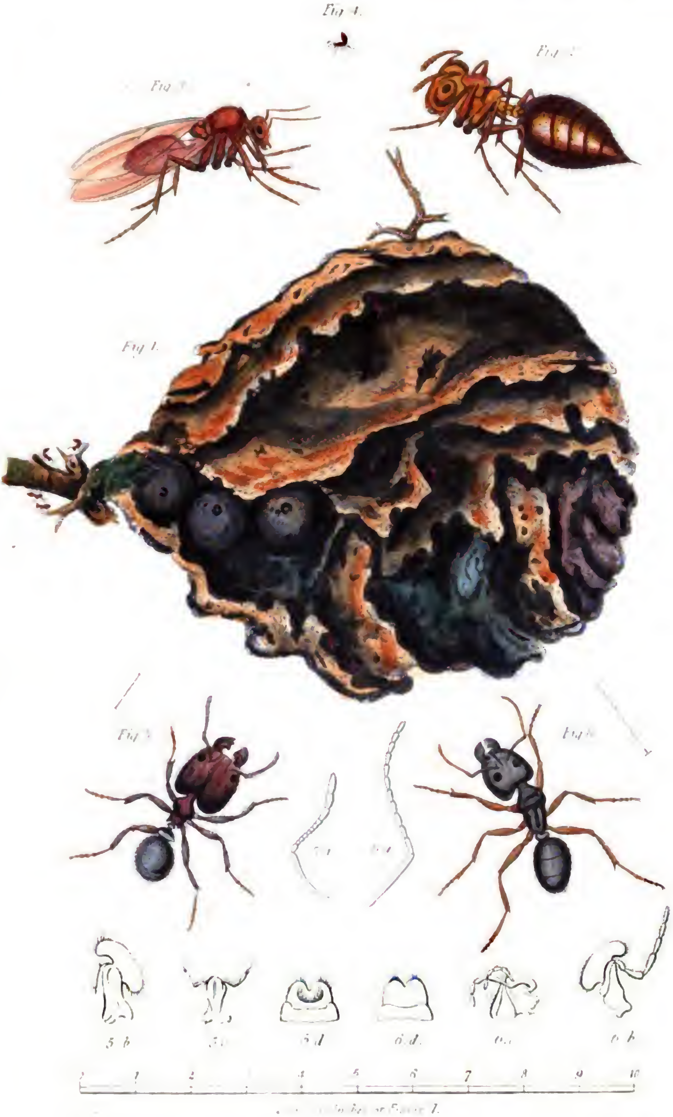
Fig. 4.
Fig. 3.
Fig. 2.
Fig. 1.
Fig. 5.
Fig. 6.
5 b
5 c
5 d
6 d.
6 c
6 b
1
2
4
5
6
7
8
9
10

appear to be removed from the neighbourhood of the centre of the nest to apartments nearer to the exterior, *pupæ* only being found in the latter.

This species of ant is remarkable for forming its nest on the branches of trees and shrubs. The construction is not only singular, but indicative of considerable ingenuity and foresight. The first I met with was near to Pahtun, a Kohlee village on the Goreh river, in the mountain districts of the Poona Collectorate. It was attached to the branches of a large Kurwund* shrub, and was somewhat globular in form; a second, subsequently met with, was balloon-shaped. They consisted of a multitude of thin folia of *cow-dung*, imbricated like tiles upon a house; the folium above all covering the summit in an unbroken sheet, like a skull-cap on a man's head. The folia were put upon one another in a wavy or scolloped manner, so that numerous little arched entrances were left, yet the interior was perfectly weather-proof. A vertical section presented a multitude of irregular cells, formed of the same material as the exterior: near the centre the cells appeared more capacious than near the surface, and a dried leaf or two had been taken advantage of in their formation. The nurseries were in different parts of the habitation; those cells nearest the centre being filled with very minute eggs; those more distant, with the larvæ enlarged; and the remote cells, with the pupæ coming into life: the last cells, indeed, had numerous winged ants in them, probably the males of the community. In the first nest examined I did not discover the queen, nor were there any stores of provisions; the insects, therefore, must have relied upon their daily exertions for subsistence. In a second nest, formed on the bough of a large Mango-tree† at Tullyghur, on the table-land of Bhima Shunkur, I was more fortunate in meeting with the queen. She was inclosed in a cell adapted to her size, and evidently could not move, as I was compelled to enlarge the entrance with my penknife to effect her liberation. She was very like a diminutive queen of white ants, and I have little doubt was the common parent of the community. Many of the eggs in this nest were not oblong, but plano-convex, the plane side being fixed to the branch of the tree; they had a gelatine character, and the rudiments of the future insect were observable in them. There was not any store of provisions, and in neither nest did I observe a distinct class of soldiers.

The inhabitants of the first nest occasioned ludicrous distress to the Europeans in my office, the draftsman and clerk. The nest had been obtained late in the evening, and was suspended from the tent-

* *Carissa Carandos.* † *Mangifera Indica.*

pole of the tent in which they slept, preparatory to examination the following day. In the night the men were awakened by repeated punctures and general irritation of the skin, but the darkness prevented them from discovering their tormentors, and they continued to toss and tumble in their beds for some hours in no very complacent state of mind: at last they got up, dressed themselves, and abandoned the tent; but the evil was rather aggravated than abated, as parts of their persons which had previously escaped had now their share of suffering. At daylight they discovered to their consternation that they were covered with minute ants, which had filled their pantaloons, penetrated the sleeves of their coats, and every other part of their habiliments. On inspecting the tent, they found the interior teeming with multitudes of little angry beings, in busy progress, seeking to resent the outrage which had been committed on the community by the removal of their abode.

My account of the natural history of this insect differs from that of the genus in which it is *provisionally* placed. I simply describe what I saw, and may have fallen into error in my deductions. I may have mistaken an extraneous insect for a queen; and I may have mistaken the winged ants for males only, while they really comprised both sexes: I may have made these mistakes; but up to the present moment my original impression remains unimpaired, that the tree ant, in its natural history, approximates rather to the *Termites* and Bees than to the genus *Myrmica*, and ultimately it may be found to be the type of a new genus*.

I had preserved the Queen ant, together with specimens of the neuters and males, in a phial; but not being able at present to find it, after a diligent search, I have every reason to fear it was one of several broken in the voyage from India, and the contents must have been lost.

The drawings were executed under the microscope, from nature, with every possible care.

The specific characters have been chosen from the drawings, assisted by a detailed description of the insect made at the time the drawings were executed.

I need scarcely mention that it is to one of the most distinguished entomologists of modern times that I have taken the liberty to dedicate this insect.

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* Smeathman gives four lines comprising a loose mention of *Termes arborum*; and in vol. vi. part 2, page 414, of Shaw, there is an engraving of the queen of this species, from what authority is not stated, resembling my queen of the *Myrmica Kirbii*. It would appear, therefore, as if Smeathman had an impression that the tree ants in their œconomy resembled *Termes bellicosus*.

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 1.

1 *a.* The nest of ***Myrmica Kirbii*** reduced in size according to the subjoined scale, with the ants of the natural size creeping upon it. 1 *b.* The male. 1 *c.* The neuter.

ATTA PROVIDENS, *Sykes*.

Plate XIII. Fig. 2.

♀ Nigra, capite magno, mandibulis et antennis nigris tarsisque flavescentibus. Caput maximum, oblongo-quadratum, postice emarginatum, piceo-nigrum. Mandibulæ latæ arcuatæ, apice truncatæ, dentibus duobus, anticè minutis. Antennæ nigræ, articulis tribus ultimis incrassatis. Thorax parvus, subbipartitus, antice convexus posticeque bispinosus. Squama anterior petiolaris parva, transversa, posterior transverso-elevata, lateribus acute productis. Abdomen rotundatum. Pedum femoribus et tibiis piceis, geniculis ferrugineis tarsisque pallidioribus.

Long. corp. lin. 2¼, lat. corp. lin. 1.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

In illustration of the habits of this species of ant I shall give the following extract from my Diary.

"Poona, June 19, 1829.—In my morning walk I observed more than a score of little heaps of grass-seeds (*Panicum*) in several places on uncultivated land near the parade-ground; each heap contained about a handful. On examination I found they were raised by the above species of ant, hundreds of which were employed in bringing up the seeds to the surface from a store below: the grain had probably got wet at the setting in of the monsoon, and the ants had taken advantage of the first sunny day to bring it up to dry. The store must have been laid up from the time of the ripening of the grass-seeds in January and February. As I was aware this fact militated against the observations of entomologists in Europe, I was careful not to deceive myself by confounding the seeds of a panicum with the pupæ of the insect. Each ant was charged with a single seed; but as it was too weighty for many of them, and as the strongest had some difficulty in scaling the perpendicular sides of the cylindrical hole leading to the nest below, many were the falls of the weaker ants with their burthens from near the summit to the bottom. I observed they never relaxed their hold, and with a perseverance affording a useful lesson to humanity, steadily recommenced the ascent after each successive tumble, nor halted in their labour until they had crowned the summit and lodged their burthen on the common heap."

On the 13th of October of the same year, after the closing thunder-storms of the monsoon, I found this species in various places similarly employed as they had been in June preceding: one heap contained a double-handful of grass-seeds.

It is probable that the *Atta providens*, is a field-species of ant, as I have not observed it in houses.

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 2.

2 *a*. *Atta providens*, neuter, magnified. 2 *b*. One of the mandibles. 2 *c*. One of the maxillæ. 2 *d*. The labium and its appendages.

Formica indefessa, *Sykes*.

Plate XIII. Fig. 3.

♀ Nigra, capite magno, thorace compresso, antennis pedibusque ferrugineis. Caput maximum atrum. Antennæ ferrugineæ, articulo primo longissimo nigro. Mandibulæ porrectæ 6-dentatæ. Thorax antice rotundatus, medio constrictus continuus, posticeque attenuatus. Squama petiolaris transverse elevata, nigra. Abdomen ovatum concolor. Femora ferruginea. Tibiæ tarsæque fuscantes.

Long. lin. 6½, lat. lin. 2.

Habitat in India Orientali circa Poona.

Mus. Dom. Sykes.

♀ capite multo minore, abdomine dilatato.

This insect approaches *F. compressa*, Fab., and infests houses.

(Among the insects collected from the same nest there are many specimens, of different sizes, having small heads, but they are uniformly much smaller than the individuals of both sexes above described. Can they be males which have lost their wings, or are they varieties of neuters?—F. W. H.)

The depths at which these ants have their nests under the foundations of houses and about the roots of trees, baffled my attempts to discover their internal œconomy; but I observed ants of three sizes, although not differing very much in form, and not at all in colour. The largest (of which a drawing is given) is the female, and I have a specimen $\frac{12}{16}$ths of an inch long: the next size is probably the male; the head and thorax are much smaller than in the female, but the abdomen in proportion is larger. The third size is probably the neuter, and differs only from the male in being more slender.

The magnitude of these ants, their voracity, and remarkable tact in discovering saccharine matters, render them repulsive, troublesome, and costly insects in a house. I have had the greater part of a tub of sugar-candy, left in my store-room at Poona, and weighing nearly half a hundred weight, consumed by them during a few months' absence from home; and my friends have related to me instances of similar depredations carried to the extent of the consumption of a whole tub of sugar-candy. However incredible the fact may appear, I will not omit to notice an instance of their instinct literally bordering upon human intelligence. It was the practice in my family to leave the dessert, consisting of fruit, cakes, and particularly China preserved fruits, constantly standing upon a sideboard in an inclosed verandah off the dining-hall: a cloth was thrown over it, and to prevent the access of insects, the legs of the table were placed upon low pedestals in little stone pans filled with water. When I first took possession of the house, the inhabited part was not infested with this species of ant, but the attractions of the sideboard soon occasioned their introduction. The channel of water surrounding the pedestals did not prove a sufficient barrier; the pans were shallow, and the channel not wider than two lengths of medium sized ants: when the water was low they waded across, and when the pans were full they boldly pushed over, and succeeded in catching hold of the opposite bank with their fore-legs ere they sunk, and once over, they soon reached their rich repast by the legs of the table, and in the morning I found hundreds congregated on the China sweets: they were put to death, but each succeeding day presented similar hordes of equally bold and successful adventurers. I now had the legs of the table surrounded daily with a belt of turpentine, just above the level of the water, and this proved effectual, either from its nauseous and deleterious scent, or from its clamminess holding them by the feet. For some days the sweets were unmolested, but eventually the ants found their way back to them, although not in such numbers as before, and I did not readily discover by what means. The edge of the table was about an inch distant from the wall, and with greater facilities of access, they did not risk the danger of passing the gulf between the table and the wall, but reduced to extremities by my precautions, the largest ants now essayed to pass it, holding on the wall by the hind legs, whilst the front legs were stretched out to touch the edge of the table, and the contact enabled very many to cross. The table was now removed from the wall beyond the maximum stretch of the largest ants, and I flattered myself I had triumphed over their perseverance and ingenuity; but, to my infinite surprise, in a few days the sweets teemed as usual with the intruders, and I was puzzled in no small degree to account for their re-appearance. Accidentally passing the table, I observed an ant upon the wall, about a foot above the level of the sweets: it fell, and instead of passing between the wall and the table and alighting upon the ground, the insect fell upon the table. Can it be possible, I said to myself, that this fall is designed? I stood to observe with the most intense curiosity: another ant ascended, and dropped with similar success; another and another followed; and there were was no longer doubt that instinct (if instinct I must call it) had made them in this instance a match for reason. But what is this "instinct," or "impulse of nature," which enables an animal to do that which, in those things that man can do, results from a chain of reasoning, and in things which men cannot do, is not to be explained by any efforts of the intellectual faculties; by which the captive and expatriated pigeon on its release flies directly and unhesitatingly through the pathless air to its distant home; by which the far-removed dog returns to his master by previously untravelled and unknown routes; by which the bed-bug, it is said, if cut off from access to the bed by the feet or draperies, ascends to the ceiling and falls upon the canopy; and by which the *Formica indefessa* was enabled to defeat all my precautions?

I could multiply instances of similar mysterious power in the animal world from personal observation, but am debarred from indulging in further details by the specific object of this paper and the nature of our Transactions. Let it suffice to remark, that the reflective mind finds new causes of wonder and admiration, and new lessons of humility, in almost every new inquiry into the œconomy, relations, and structure of the animate or inanimate world.

In concluding this paper, I may add, as a suitable accompaniment, two extracts from my Diary respecting the swarming of ants.

"Poona, October 6, 1829.—At ten o'clock in the morning, during a hot sun, but after a continued fall of rain on the preceding night, a nest of white ants in my garden sent forth a winged colony in myriads; the small wingless labouring white ants were busily employed about the orifice whence the swarm issued, apparently superintending the emigration. Scarcely had they appeared, than the domestic poultry were on the alert; Sparrows, Grackles, and Crows collected in numbers, and within a quarter of an hour there were *some scores* of Kites (*Milvus Cheel*) making short circles within a few feet of the ground, and catching the ants as they rose upon the wing. The dexterity with which these large birds avoided coming into contact with each other, in rapid and whirling pursuit of their prey within a very limited space, excited my surprise and admiration."

"Poona, June 10 to 12, 1830.—A good deal of rain fell between the 10th and 11th of June, the first of the year, being, in fact, the setting in of the S.W. monsoon. After the 12th, the moisture, combined with the great heat, (heat alone being insufficient,) brought into life myriads of insects of all kinds, which for months previously had been lying in the pupa state: colonies of ants, white, black, and red, large and small, poured from their retreats in dense columns, taking wing, and literally darkening the air. As in the preceding year, birds of every description were in eager pursuit. In an hour or two the volant power of the ants terminated, their wings dropped off, and lay in such profusion on the ground around their nests as to form a carpet, and the insects themselves were seen hurrying away in every direction into concealment, or lying dead upon the grass, having completed the term of their ephemeral existence. It would appear from the above dates that ants swarm at different periods of the year, but whether or not the same nest sends forth two colonies, or different nests swarm at different seasons of the year, I did not determine."

DESCRIPTION OF THE FIGURES.

PLATE XIII. Fig. 3.

3 *a*. *Formica indefessa*, neuter magnified. 3 *b*. One of the mandibles. 3 *c*. One of the maxillæ. 3 *d*. The lower lip and its appendages.

Supplementary Note, read January 5th, 1835.

I take the present opportunity of exhibiting to the Society a gigantic specimen of the *Formica indefessa*, an account of which was read some months since, measuring $\frac{13}{16}$ths of an inch in length. It is no doubt a female, and very many of them are seen amongst the workers. I may here say with respect to the *Termes bellicosus*, *Formica indefessa*, and *Atta providens*, that I never saw winged ants amongst them, excepting at the time of swarming; I believe, nevertheless, their communities to consist of queens, neuters, and males, the latter being wingless, unless at the period mentioned. In an examination of very many nests of the *Termites*, I never found a king shut up in the same chamber with the queen, as described by Smeathman, and I fully believe that a complete, patient, and philosophical investigation into their œconomy is still a *desideratum*.

XXIII. *Monograph on* Mimela, *a Genus of Coleopterous Insects. By the Rev.* F. W. Hope, *F.R.S., &c.*

[Read September 1, 1834.]

LAMELLICORNES.

Fam. RUTELIDÆ.

MIMELA, *Kirby*.

Character Essentialis.

MANDIBULÆ dorso rotundatæ, apice compressæ, bidentatæ; dente inferiori truncato. *Antennæ* novem articulatæ.

Character Artificialis.

Labium urceolatum, emarginatum.
Maxillæ apice sex-dentatæ, nempe 3, 2, 1.
Mandibulæ dorso rotundatæ, apice compressæ bidentatæ; dente inferiori truncato.
Labrum brevissimum, transversum, medio depresso-excavatum, vel emarginatum.
Antennæ novem articulatæ.
Podex tectus.

Character Naturalis.

Corpus ex oblongo obovatum, convexum, glabrum, alatum. *Caput* ex triangulari subrotundum, declive. *Labrum* transversum, brevissimum, medio depressum, utrinque antice barbatum, verticale. *Mandibulæ* basi subtriquetro-trigonæ, intus orbiculatæ, transversim sulcatæ, apice compressæ, incurvæ, bidentatæ; dente superiori obtuso, inferiori truncato subemarginato, dorso rotundato. *Maxillæ* validæ mandibulæformes, apice incurvæ sex dentatæ, dentibus nempe 3, 2, 1. *Palpi maxillares** in nostris speciminibus desunt. *Labium* infra apicem et apud basin constrictum unde quasi urceolatum, apice emarginatum. *Palpi labiales* triarticulati: articulo primo minutissimo, intermedio subarcuato crassiori; extimo ovato acuto. *Mentum* subquadratum. *Antennæ* novem-articulatæ: articulo primo magno apice incrassato, quasi dolabriformi; secundo brevi subturbinato; proximis tribus subcylindricis; sexto brevissimo fere pateræformi; tribus ultimis elongatis pilosis, clavam elongatam lineari-lanceolatam formantibus. *Oculi* subhemisphærici prominuli. *Septum* irregulare, a naso per tertiam fere partem oculi transcurrit. *Nasus* s. *clypeus* transversus, distinctus, antice rotundatus, marginatus: margine reflexo. *Rhinarium* verticale, brevissimum.

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* (4-articulati, articulis fere equalibus, ultimo paullo majori ovato, apice acuminato.—F. W. H.)

Truncus: *Thorax* transversus, s. longitudine latior, tenuissime marginatus, antice angustior; sinu magno ad recipiendum caput exciso, postice obsolete trilobus: lobo intermedio rotundato, supra ad latera, puncto ordinario impressus. *Prosternum* inter pedes anticos elevatum, compressum, apice dilatatum, oblique truncatum. *Mesosternum* lineare, inter pedes intermedios latitans. *Metasternum* basi et apice mucronatum: mucrone postico bifido. *Scutellum* triangulare.

Coleoptra oblonga, striata, striis duplicatis; podicem, excepto summo vertice, obtegentia. *Pedes* robusti: femoribus posticis incrassatis; tibiis anticis apice bidentatis: dente exteriori longiori obtuso; interiori brevi acuto; calcaribus 1. 2. 2. posticis obtusis; tarsorum unguiculis simplicibus* inflexis.

Abdomen convexum; segmentis ventralibus sex; primo brevissimo; ultimo depresso obtuso.

Probably no insect described by my much valued friend Mr. Kirby more strongly evinces his peculiar tact in establishing sound genera than the subject of the present monograph, viz. *Mimela*. From his own account in the 14th volume of the Linnæan Transactions, he purchased this insect with a lot of Brazilian species, and at first ranged it with *Areoda*, its general habit and aspect resembling a tropical American type: meeting, however, afterwards with several other specimens in a Chinese collection, he was induced to examine it more closely, and the result of these observations was embodied in his valuable paper in the Linnæan Transactions, in which he proves distinctly that many of the characters of *Mimela* appear as if borrowed from South American types, while its most essential ones approach nearer to *Euchlora*, the Asiatic type. Many entomologists would, therefore, have rested contented with arranging it along with *Euchlora*, as the French do at the present moment. Not so, however, Mr. Kirby; he immediately formed it into a sub-genus, and added the preceding ample characters.

The distinguishing characters of *Mimela* appear to be the shape

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* (Mr. Kirby's specimens appear to have been destitute of the four anterior tarsi. They differ from the posterior pair, as described by Mr. Kirby, in having one of the claws on each of these four legs bifid.—F. W. H.)

of the insect as well as the presence of a prosternum: for a moment it may be worth while to look to the use of this latter member. It is probable that this attachment may serve to counteract the weight of the body, which is posteriorly much dilated; or else, why in the allied genus *Euchlora* is this posterior dilatation wanting as well as the prosternum? In some *Adephaga* we find it strongly developed, particularly in *Procrustes* and the larger *Carabidæ*; and in several genera, where the abdomen is large in proportion to the thorax, we find the prosternum of a large size, particularly in *Dynastidæ*, and also in *Chiasognathus Grantii* and *Prionus Hayesii*. It would seem, however, that this is not always a sufficient support to counteract the weight of the body, or why do we find those hooks on the antennæ which support the latter insects when at rest? It is probable also that the prosternum is of great use to all insects which are climbers, as we find it developed in *Calosoma, Hydrous*, &c.; and, I think, in proportion as the mesosternum increases in size, there is less need of a prosternum, as in *Cetoniadæ* it altogether takes its place, and serves probably the same purpose. From an examination of the *Buprestidæ* we may partly arrive at the use intended by this member; in the first section, viz. the exscutellati, containing the genus *Sternocera*, an example of which is *S. Chrysis*, Fab., the mesosternum is remarkably strong, projecting between the fore-arms: in this instance the anterior part of the insect is greatly dilated, while towards the apex it is greatly diminished, tapering off almost to a point. In *Catoxantha bicolor*, Fab., we find nearly the reverse of this; the posterior part of the body is greatly dilated, and instead of the development of the mesosternum, we find only that of the prosternum, which descends deeply into the breast. In the Indian *Rutelidæ* this posterior dilation of the body is not always attended with a prosternum, as an insect subsequently described under the name of *Aprosterna*, closely allied to *Mimela* (as well as the genus *Rhombonyx*, Kirby,) both of which are without a prosternum. In my forthcoming monograph of *Euchlora* this subject, however, will be more fully detailed. At present it is time to say a few words on the geographical distribution of this genus.

Mimela appears widely dispersed over the continent of Asia, and eventually it will no doubt be discovered wherever *Euchlora* is found. I have not yet been able to ascertain its occurrence in Sumatra, Borneo, or Manilla, or even in New Guinea or the Isle of Timor; and as the entomological character of the above countries appears to resemble that of continental India, I have little hesitation in saying, that we may ultimately expect several species from those quarters, possessing as I do several species of *Euchlora* from the above places.

The most southern range known at present appears to be the island of Java; from Singapore it may be traced up to the Himalaya. On the east its boundary is terminated probably by the Japan Isles, and on the west by Madras. I am doubtful, however, if it can be traced to Bombay, having repeatedly received numerous collections from that country, but never a single specimen of *Euchlora* or *Mimela*. According to Mr. Kirby, it is found also in the island of Ceylon. China evidently appears to be its metropolis; and judging from the immense numbers sent to this country, it must really there be quite a pest. When to the *Mimelæ*, emerging from the leafy coverts of the wood, we add the swarms of *Euchloræ*, and the hosts of booming Beetles, the dazzling *Lampyridæ*, or Fire Flies, with genera of various orders, the air must literally teem with the countless myriads of insect population, offering to the sight a picture which the warmest European imagination has not the power to conceive. These *Mimelæ* have their use as well as all other insects, and the office assigned them is probably to keep in check the over-luxuriance and superfluity of tropical vegetation.

Genus Mimela.

Type of the Genus, *Mimela Chinensis*, Kirby.

Section 1. With a Prosternum. (*Mimela* proprie sic dicta.)

		Patria.
Species 1.	*Chinensis*, Kirby	China.
2.	*Confucius*, Hope	Ditto.
3.	*Blumei*, De Haan	Java.
4.	*Lathami*, Hope	China.
5.	*Lucida*, De Haan	Japan.
6.	*Splendens*, Hope	Nepal.
7.	*Auronitens*, Hope	Ditto.
8.	*Horsfieldii*, Hope	Ditto.
9.	*Leei*, Swed. (*fastuosa*, Fab.)	East Indies.
10.	*Chrysoprasus*, Hope	
11.	*Bicolor*, Hope	Nepal.
12.	*Similis*, Hope	Ditto.

Section 2. Without a Prosternum (Aprosterna).

1.	*Nigricans*, Kirby	China.

1. Mimela Chinensis, *Kirby*.

M. supra luteo-virens; capite thoraceque punctatis punctulatissimisque, antennis fulvis.

Long. corp. lin. 9, lat. lin. 5.

Syn. Mim. Chinensis. *Kirby, Linn. Trans.*
chrysea. *Kollar.*
splendens. *Schonherr.*
stilbophora. *Wied.*

Corpus glaberrimum, luteo-virens, colore sub luce mutabili, subtus cupreo tincturi. *Caput* supra antice punctis confluentibus rugulosum, postice punctis sparsis conspersum, interque puncta creberrima minutissima, vix sine lente forti conspicua; subtus fulvum. *Antennæ* fulvæ. *Thorax* punctis sparsis punctulis minutissimis interjacentibus ut in capite. *Elytra* subrugosa puncto-striata: striis intermediis per paria ordinatis, interstitiis punctatis et punctulatissimis ut in thorace, &c.; apice gibba.

Habitat in China.

Mus. Dom. Hope.

2. MIMELA CONFUCIUS, *Hope.*

Supra tota viridis, subtus pallide bronzea, femoribus flavis tibiisque roseo-cupreis.

Long. lin. 9½, lat. lin. 5¼.

Caput cum *clypeo* subquadratum, antennæ fulvæ, oculi fusco-cinerei. *Thorax* angulis anticis subacutis, marginibus lateralibus flavescentibus, punctatissimus, punctulis minutissimis ut in capite. *Scutellum* læve subtiliter punctulatum, punctis lente vix distinctis. *Elytra* parum rugosa, punctato-striata, striis intermediis per paria ordinatis, interstitiis creberrime punctatis. *Pygidium* antice aurato-viride, sparsim punctatum, foveolâ transversâ utrinque posita posticeque flavescens. *Corpus* infra fusco-æneum, punctatum, femoribus flavis æneoque colore tinctis. *Tibiæ* unguibusque roseo-cupreis.

Habitat in China.

Mus. Dom. Hope.

3. MIMELA BLUMEI, *De Haan.*

Supra flavo-bronzea subviridique colore tincta, subtus testacea, tibiis unguibusque piceis.

Long. lin. 6¼, lat. lin. 4.

Caput cum *clypeo* subquadratum punctatissimum. *Antennæ* fulvæ. *Oculi* quasi iride aurata pupillaque nigricanti ornati. *Thorax* angulis antice acutis, lateribus flavo marginatis, punctatissimus punctulis minutissimis ut in capite. *Elytra* rugosa, apice gibba, punctato-striata, striis intermediis per paria ordinatis, interstitiis punctatis et punctulatissimis. Margo exterior elytrorum e humeris fere ad apicem viridi colore tincta est. *Corpus* infra testaceum, pectus pilis flavescentibus densum, abdomen concolor pilisque flavis adspersum. *Pedes* validi, femoribus luteis, tibiis unguibusque piceis.

Habitat in Java.

Mus. Dom. Hope.

This insect I received from my friend De Haan of Leyden, by whom it was named *Blumei*.

4. Mimela Lathamii, *Hope*.

Tota supra viridi-inaurata, nitida humeris marginibusque elytrorum igneo colore micantibus.

Long. lin. 8¾, lat. lin. 5¼.

Affinis *M. lucidulæ* (De Haan) at postice latior. *Caput* cum *clypeo* subquadratum, glabrum et nitidum. *Antennæ* fulvæ. *Oculi* fusco-cinerei. *Thorax* foveola utrinque ignitâ, punctatissimus punctis lente distinctis. *Elytra* subrugosa, punctato-striata, striis intermediis per paria ordinatis, interstitiis sparsim punctulatis sub lente distinctis, viridi-inaurata, basi, marginibus, tuberculisque ad apicem positis igne micantibus, binæ rugæ inter tubercula et suturam fortiter impressæ (quæ cito in tenuitatem desinunt). *Pygidium* glabrum, fulgore aurato conspicuum et subtiliter punctulatum. *Corpus* infra viridi-bronzeum seu roseo colore tinctum. *Pectus* pilis cinereis adspersum. *Pedes* virides.

Habitat in China et circa Singapore.

Mus. Dom. Hope.

I first obtained this splendid insect from my friend Mr. Latham, after whom I named it. I have since received it from China, where it appears to be an abundant species.

5. Mimela lucidula, *De Haan*.

Supra tota viridis, inaurata, marginibus elytrorum igneo colore micantibus, infra roseo-cuprea.

Long. lin. 8¼, lat. lin. 4¾.

Affinis præcedenti at minor. *Caput* cum *clypeo* subquadratum nitidum. *Antennæ* fulvæ. *Oculi* nigri. *Thorax* foveola viridi utrinque impressa, confertius punctatus. *Elytra* subrugosa striato-punctata striis sub lente parum distinctis, punctis minutissimis ut in capite. Margo externus elytrorum aurea et ignita. *Pygidium* læve et crebre punctatum. *Corpus* infra roseocupreum, pedibus viridibus.

Habitat in Japonia.
Mus. Dom. Hope.

This beautiful insect I received from De Haan under the name of *lucidula*: besides the difference of locality, it differs greatly in size and punctation. *Mimela Lathami* is also a more brilliant insect, and broader considerably at the apex of the elytra, while *lucidula* has a more elongated form, and approaches in some degree to the form of *Euchlora*.

6. MIMELA SPLENDENS, *Hope*.

Supra tota viridis, nitidissima, subtus testacea tarsis nigro-brunneis.
Long. lin. 7, lat. lin. 3½.

Clypeus rotundatus, antennæ ferrugineæ. *Thorax* subtilissime punctatus, scutellum læve. *Elytra* viridia inaurata, striato-punctata, binis sulcis versus apicem fortiter impressis, tuberculoque rotundato apicali conspicua. *Corpus* subtus testaceum, æneoque colore tinctum, femoribus et tibiis flavescentibus, tarsis unguibusque nigro-brunneis.

Habitat in agro Nepalensi.
Mus. Dom. Hope.

This species was in the collection of Major-General Hardwicke, to whom I am indebted for this and various other *Coleoptera*. It also appears to be by no means uncommon in the Himalaya, as I have seen it abundantly in the boxes sent from that country.

7. MIMELA AURONITENS, *Hope*.

Supra viridis, nitidissima, subtus picea, tibiis tarsisque viridibus.
Long. lin. 6½, lat. lin. 4.

Antennæ piceæ. *Caput* cum *clypeo* subquadratum, viride, glabrum nitidum. *Oculi* nigri. *Thorax* concolor, angulis anticis subacutis. *Elytra* nitidissima, humeris tuberculisque apicalibus igne micantibus. *Corpus* subtus piceum, pectus pilis cinereis densis tectum. *Abdominis* penultimum segmentum violaceum. *Femora* picea. *Tibiæ* et ungues saturate virides, parum punctatæ et pilosæ.

Habitat in Bengalia.
Mus. Dom. Hope.

8. MIMELA HORSFIELDII, *Hope*.

Viridi-inaurata, sumptuosa, thorace aureo-maculato, elytrisque binis igneo-auratis vittis ornatis.
Long. lin. 6½, lat. lin. 3½.

Caput cum *clypeo* subquadratum, punctulatum, antice auratum, postice viride. *Oculi* fusco-cinerei. *Antennæ* fulvæ, capitulo nigricanti. *Thorax* viridis, maculis duabus aureis, fere in medio disci positis; pars *antica*, marginesque laterales confertius punctati; *postica* autem glabra et nitida. *Scutellum* læve. *Elytra* nitidissima, vittis binis igne micantibus, una fere media, altera marginali. *Pygidium* flammeum, convexum et subtiliter punctulatum. *Corpus* infra viride, splendidum et punctatum. *Segmenta* abdominis antice violacea. *Pedes* virides, femoribus posticis incrassatis auroque fulgentibus.

Habitat in agro Nepalensi.

Mus. Dom. Hope.

Mimela sumptuosa? *Zool. Journ.* 5.

This beautiful insect I received from General Hardwicke, and for a long time I imagined it was identical with *M. fastuosa*, Fab. Having purchased at a sale the insect described by Fabricius, I have been able to compare the insects, and find the present species is unknown; it is named, therefore, in honour of Dr. Horsfield, who has so ably written on the *Lepidoptera* of Java.

9. MIMELA LEEI, *Swederus et Olivier.*

M. viridi-ænea, nitida, elytris vittis duabus aureis. *Fab.*

Long. lin. 8, lat. lin. 4½.

Scarabæus Leei scutellatus muticus cœruleus nitissimus, capitis disco, thorace fascia interrupta elytrisque vittis quatuor aureis.—*Swederus, Act. Holm.* 1787, 188. 4. *Oliv. Ins.* 1.5. 30. *t.* 8. *f.* 87.

Mel. fastuosa. *Fab. Ent. Syst.* ii. 168. 57.; *Syst. El.* ii. 173.

Habitat in India. Dom. Lee.

M. viridi-inaurata, thorace auro maculato, elytris vittis duabus aureis. Statura Mel. vitis, at major. *Clypeus* rotundatus. *Caput thorax*que viridia inaurata, maculis aureis. *Elytra* viridi-cœrulea, inaurata, vittis duabus aureis. *Corpus* subtus viridi-cœruleum nitidum. *Oliv.* vid. *Sp.* 32. *Melolontha.*

Viridi-inaurata. *Caput* cum *clypeo* subquadratum viridi-auratum, nitidum, subtiliter parce punctulatum. *Clypeus* brevis, transversus, concolor, confertius punctatus, margine reflexo integerrimo. *Antennæ* fusco-ferrugineæ. *Oculi* magni, atri. *Thorax* antice emarginatus angulis acutis, lateribus rotundatus, punctatus, supra viridis, macula magna aurea, utrinque dorso posita, haud ad latera extensa, aut in medio disci conjuncta. *Scutellum* breve, violaceum, postice fere rotundatum, læve, antice parce punctatum. *Elytra* apice truncata, punctato-striata, viridi-inaurata, splendida, suturâ violaceâ, binis vittis viridi-cyaneis, binisque aliis aureis, igne micantibus, ornata. Ad apicem rugæ quatuor (in singulo duæ,) fortiter impressæ. *Podex* lato-triangularis, convexus, viridique-auratus et punctatissimus. *Corpus* infra viridi-cæruleum.

I have described this species minutely from the identical specimen which was in Lee's cabinet, described by Fabricius, as I formerly confounded a Nepal species with it, which is very distinct.

10. MIMELA CHRYSOPRASUS, *Hope.*

Totum corpus supra viride, femoribus flavescentibus.

Long. lin. 8, lat. lin. 4.

Caput cum *clypeo* subquadratum. *Oculi* fusco-cinerei. *Antennæ* testaceæ. *Thorax* nitidus, punctatissimus. *Elytra* pallide virescentia, et aurato splendore nitentia, punctato-striata, striis intermediis per paria ordinatis, interstitiis sparsim punctulatis. *Pygidium* viride. *Pectus* infra concolor, flaveolis capillis adspersum. *Segmenta* abdominis flavescentia, nitida. *Femora* aureo-testacea. *Tibiæ* antice concolores, posticæ virides, tarsis unguibusque atro-virescentibus.

Habitat in India, circa Singapore.

Mus. Dom. Hope.

11. MIMELA BICOLOR, *Hope.*

Supra testacea, subtus viridis.

Long. lin. 6, lat. lin. 3.

Clypeus rotundatus, testaceus aureo colore tinctus, subtilissime punctatus. *Elytra* striato-punctata lævia. *Corpus* subtus nigro-viride, unguibus solummodo testaceis.

Habitat in agro Nepalense.

Mus. Dom. Hardwicke.

12. MIMELA SIMILIS, *Hope.*

Præcedenti affinis. Testacea, elytris pallidioribus tarsisque virescentibus.

Long. lin. 5½, lat. lin. 3.

Clypeus rotundatus, oculis nigris. *Antennæ* testaceæ, capitulo nigricante. *Thorax* rubro-testaceus, aureoque colore tinctus. *Elytra* pallide testacea, lævia, striato-punctata. *Corpus* subtus testaceum, pectore æneo-nigricante tarsisque viridi-auratis. Variat quibusdam segmentis abdominis æneo-piceis.

Habitat in agro Nepalensi.

Mus. Dom. Hardwicke.

Subgenus APROSTERNA, *Hope.*

The type of which is *Mimela nigricans*, Kirby.

APROSTERNA NIGRICANS.

M. nigro-picea, capite thoraceque-punctatis, antennis brunneis. Long. lin. 7.

Descr.—Corpus oblongum, glabrum, nitidum nigro-piceum. *Caput* æneo tinctum, punctatum, punctulis haud interpositis ut in *M. Chinense*; puncta antica confluunt. *Antennæ* brunneæ. *Prothorax* æneo tinctus, punctatus, punctulis haud interpositis. *Elytra* punctata, punctis quibusdam sparsis et aliis seriatim ordinatis, seriebus per paria dispositis. Punctula itidem minutissima inter hæc puncta interposita. In aliis *M. Chinensem* exactissime refert hæc species, sed minor est.

Habitat in China.

Mus. Dom. Hope.

DESCRIPTION OF THE FIGURES.

PLATE X. Fig. 7.

Mimela Chinensis, and its details.

7 *a*. Labrum. 7 *b*. Mandible. 7 *c*. Mandible seen in front. 7 *e*. Maxilla. 7 *f*. Instrumenta labialia. 7 *g*. Antenna. 7 *h*. Head and prothorax in profile. 7 *i*. Metasternum and posterior trochanter. 7 *k*. Fore leg. 7 *l*. Middle leg. 7 *m*. Posterior leg.

XXIV. *Note upon the British Genera* Acentria, Acentropus, *and* Zancle. *By* J. O. WESTWOOD, *F.L.S., &c.*

[Read July 7, 1834.]

IN Mr. Stephens's Catalogue of British Insects, *Mandibulata*, p. 316, we find the following entry:

"Genus 28. (549), Acentria, *mihi.*
Phryganea, *p. Olivier?*
"3562. 1: nivosa.
Ph. nivea, *Olivier? Latr. t.* xiii. 93?"

This genus is placed in the order *Neuroptera*, and family *Perlidæ*. In Mr. Curtis's Guide, col. 137, the same genus is introduced, but it is inserted at the end of the *Trichoptera*, and is numbered 762.

In his British Entomology, No. 497, however, the latter author, without the slightest reference to *Acentria*, has published a figure and description of the same insect under the name of *Acentropus Garnonsii*, which he has numbered 762[a], thus indicating its connexion with *Acentria*. Mr. Curtis has again placed the insect in the order *Trichoptera* and family *Phryganidæ*, and has made use of various arguments for the purpose of proving that the insect in question is Trichopterous, and not Lepidopterous.

Having purchased a specimen of this very remarkable insect at the sale of Mr. Haworth's collections, I have carefully examined it, with a view to the determination of its real situation. The result of this examination has proved that Mr. Curtis has overlooked two characters which are peculiarly characteristic of the order *Lepidoptera*, and which are possessed in so striking a degree by the insect in question, that no reasonable doubt can any longer exist as to the impropriety of its insertion amongst the *Trichoptera*.

In the first place, *the front* of the thorax is furnished on each side with a pair of *patagia*, or tippets, which extend to the base of the anterior wings; and, in the second place, the base of the second pair of wings is armed with a long bent rigid bristle, connected with an apparatus on the under side of the first wings at the base, and which apparatus is distinguished in the 'Introduction to Entomology' under the names of the *hamus*, or hook, and *tendo*, or tendon. The scales on the wings are also eminently characteristic of a Lepidopterous insect.

As to the genus, or even family of *Moths*, to which the insect in question is most nearly allied, or of the propriety of the specific name with reference to its identity with Olivier's insect, I shall offer no opinion on the present occasion, observing only that Mr. Haworth's specimen was labelled "Alba Olivier."

In Mr. Stephens's 'Nomenclature', second edition, p. 118, we find another genus established under the name of *Zancle Hansoni*.

Mr. Hanson having however allowed me, some years ago, to examine his insect, and having made at the time a series of drawings of its different organs, I have ascertained, by a comparison thereof with *Acentropus* or *Acentria*, that Mr. Hanson's insect is congenerous therewith, being probably the female of the *Acentropus Garnonsii*.

XXV. *Observations on the Ravages of* Limnoria terebrans, *with Suggestions for a Preventative against the same. By the Rev.* F. W. Hope, *F.R.S. &c.*

[Read November 3, 1834.]

In laying before the Society some specimens of wood perforated by *Limnoria terebrans*, (a crustaceous animal allied to the marine *Oniscidæ*, or sea wood-lice,) my chief object is to elicit any observations which may tend to counteract its ravages.

A very able paper, by Dr. Coldstream, appeared in April last in Professor Jameson's Journal, wherein its history, habits, and anatomical details are sketched with an accuracy which does honour to this useful pupil of Leach. It lives on the wood, which it perforates, and, as far as I have observed, so also does *Ligia oceanica*, and probably others of the *Oniscidæ*, marine as well as terrestrial. This fact, however, I believe was first made known to us by Dr. Coldstream, who states that the contents of the stomach resemble comminuted wood. From finding the common wood-louse in outhouses, and *in* and *about* decaying timber, it appears to me not improbable that they also may partly feed on wood.

I hope I may here be allowed to express a wish that some of the members present will examine the contents of the stomach of the common wood-louse under a powerful microscope, and give us at some of our meetings the result of his investigation.

As the generic characters of *Limnoria* are well laid down, and as the animal is figured in the above-quoted Journal, I pass on to the objects of its attacks, and also to the remedies which have been applied to counteract its effects.

Fir, birch, and oak were nearly all equally attacked by it. Teakwood alone remained unperforated; probably, therefore, other *ironwoods* may be employed with like success. Among the experiments made to resist this evil, the following were the most important:

1st. Covering the piles with broad-headed nails, called scupper-nails, the oxidation of which impregnating the wood, yields a taste disliked by the animal. This plan for a time succeeds: the rapid consumption of iron, from the action of salt water, at length rusts off the broad heads, and it is necessary continually to replace them. Some have used copper-sheeting with partial success; others have used common tar, with which they daub the piles before they bury them in the sea: but in a short time, from abrasion, the piles are robbed of this coating, and become perforated by the *Limnoriæ.*

There is an announcement in the public Journals, that Mr. Stevenson has discovered a varnish capable of protecting wood from the attacks of this destructive pest. What this varnish may be I am at a loss to conjecture; I only hope that Mr. Stevenson will shortly make his discovery known, and as publicly as possible, as he may be the means of saving the wood-work of our floodgates, timber-bridges, chain-piers and docks from inevitable destruction.

At the chain-pier at Southend in Essex the piles are daubed over with gas tar; and from inquiries made on the spot from the workmen employed, I found that there exists a general belief that where common tar fails, gas tar succeeds, the insects, as the workmen assert, not liking its taste.

Both the varnish of Mr. Stevenson and the gas tar may succeed for a time; abrasion, however, will at length remove them: would it not therefore be possible, by means of perforated iron pipes running through the centre of the piles, occasionally to supply liquidated tar, and so keep up this gaseous influence? The expense of the pipes would probably be too great. It is ascertained that the *Limnoriæ* attack neither the bottoms of ships, nor fresh-tarred piles newly placed in the sea, partly, perhaps, as it requires time for abrasion to take place, and partly as the effect of the tar is not neutralized by salt water. Tar appears to be an antidote: gas tar may be more efficacious; and as the oxidation of iron is effective for a certain period, probably by uniting two or more of these, we may preserve the piles for a longer period than has hitherto been done. In the sea I would form a bed of gas lime, next add a thick stratum of gas tar, and then drive the piles into it, coating them well over with gas tar beforehand: by these means some good might be effected. By nailing also to the piles portions of honeycombed wrought-iron gas pipes, (which might be purchased, I imagine, for a mere trifle,) the gaseous taste might be kept up. Another remedy might be tried by saturating the piles with strong solutions of corrosive sublimate. Moreover, should the spirit of caoutchouc (or Indian-rubber) be found eventually to be disliked by the *Limnoriæ*, we shall then have a cheap and easy remedy. So long as *wood* is used in the bedding of our marine public works, so long the annual loss must be great. As in five or six years the wooden piles become perforated and nearly useless, might it not be possible, by means of cast-iron hollow pipes filled with cement, and coated with a varnish externally, to make them last for twenty or thirty years? As this is a mere matter of calculation as to expense, I do not wish to enter upon it; any observations which may tend to keep the wood sound for a long period, is the present object of inquiry.

In concluding these observations, I have only now to add, that I think an inquiry on the subject of antidotes against the *Limnoria* is well worthy the attention of this Society; and I assure myself that the majority of its members unite with me, when I express a wish that as a Body we may be equally distinguished for practical usefulness, as for entomological science. In short, if we can save the wood-work of chain-piers and docks from the destruction of the *Limnoria*, and diminish the ruinous expenditure they entail upon us, the Society will establish no small claim to the gratitude of the public.

XXVI. *Description of a new Species of* Australian Moth. *By* G. R. GRAY, *Esq., M.E.S. France & London.*

[Read March 2, 1835.]

I BEG to call the attention of this Meeting to a new and beautiful Australian Moth, from the superb collection of Mrs. Children, to whose liberality I have been before indebted.

As the insect in question possesses several characters totally distinct from those with which I am acquainted, I propose to form it into a separate sub-genus, with the following characters:

Order, LEPIDOPTERA.

Section, LEP. NOCTURNA.

Family, NOTODONTIDÆ.

Subfam., ENDROMINA.

Genus, ENDROMIS.

Subgen., CHELEPTERYX, *m.*

Antennæ long, slender, bipectinated in both sexes, the bipectinations of the male long, while those of the female are much shorter; in both sexes they are incurved. *Palpi* very short, hairy and obtuse. *Head, thorax,* (especially the under part,) and *abdomen* thickly clothed with fine, long hairs, which also cover the base of the wings. *Wings* entire, broad, the fore wings subtriangular, with the anterior margin much longer than the others; the outer margin of the male somewhat curved outwards anteriorly, and inwards near the posterior angle, while that of the female is rounded; the posterior wings with the anterior margin advanced beyond the posterior angle of the fore wings, and the outer margin much rounded, but curved at the apex in the manner of a hook or scythe; the wings of both sexes are somewhat diaphanous, being covered with hair-like scales; the discoidal cell of the posterior wings is closed. *Feet* slender, armed at the apex of the four posterior tibiæ with slender spines, the under part of the femora clothed with fine woolly hairs.

C. *Collesi,* Children.

Alis nigris; anticis prope apicem maculis duabus hyalinis, griseo et ochraceo-variegatis, strigis undulatis, nigris et griseis; posticis fasciâ mediâ albidâ, alterâque prope marginem undulatâ ochraceâ.

Exp. alar. ♂, 5 poll. 8 lin., ♀ 6 poll. 5 lin.

Habitat in Australia (Sydney). In Coll. Dominæ Children.

The *antennæ* and *palpi* of the male are black; *head* ochraceous; *thorax* and *abdomen* black tinged with brown, varied with an ochraceous colour. *Anterior wings* with two large diaphanous spots near the apex, between the second, third, and fourth nervures; the general colour black, varied with gray and ochraceous, in the form of waved transverse bands; the *posterior wings* black, with the hinder portion varied with ochraceous, and a longitudinal whitish band across the middle; also a waved bright ochraceous band near and running parallel with the outer margin.

The lower surface of the fore wings black, with the outer half and anterior margin mixed with gray, and an oblique transverse whitish band across the middle; also two white spots in the discoidal cell, the former nearest the base small and round, the latter somewhat lunate near the band; the nervures near the outer margin ochraceous. The lower surface of the posterior wings also black, thickly clothed with whitish or ash-coloured scales, with a waved black band and a row of black spots, one on each nervure, both of which cross near the middle.

The colour of the female insect is universally much lighter, being of an ash varied with gray; the dark uneven marginal band across the middle of the anterior wing is more apparent, but the ochraceous waved band on the lower wings of the male is scarcely visible in this sex.

This insect, as far as I am able to judge from the appearance of the imago, is perhaps allied to, and may be considered the Australian analogue of that which, both from its extreme rarity and beauty, is called in this country the "Glory of Kent," and by systematic writers "*Endromis versicolora*," which I believe (with the one in question) to be peculiar for having the antennæ bipectinated in both sexes; but further analogy cannot be ascertained, until the larva and chrysalis are made known by some resident of the country which the insect inhabits. Should chance favour me with the means of laying them before the Society, I will take the first opportunity of doing so, and thus complete my paper.

The specific name of *Collesi* was proposed by the late respected President of this Society in honour of Mr. Colles, who brought several specimens to this country; and it is with great pleasure that I have adopted the name thus proposed.

XXVII. *Observations on Insects producing Silk, and on the possibility of rearing Silk Crops in England. By the Rev.* F. W. Hope, *F.R.S., &c.*

[Read December 1, 1834.]

Previously to entering on the subject of this paper, I will offer some statistical *details*, illustrative of the vast importance to the commercial prosperity of this great country, of the few insects producing silk. These details may stimulate the entomologist to pursue particular lines of inquiry; and why may we not hope that the result of such researches will be the addition to our productive sources of various new species of these little labourers, to whom man already owes so much? species which might be available at our own doors, by their capacity of enduring our climate, and thriving on its vegetable productions, and, in case it were necessary, by having recourse to artificial means for their culture? May we not suppose the manufacturer would find his hothouses for silk-worms as profitable a speculation, with extended demand, as the fruiterer does his hothouse for the supply of the comparatively limited demand for the luxurious desserts of the rich?

In the years 1832–3 respectively, the quantity of silk imported for home consumption was 4,392,073lbs. and 4,758,453lbs., being an increase of 3¼ per cent. in the latter year. The value of the exports for those years was 529,990*l.* and 740,294*l.*, being an increase of 40 per cent. in one year. The average for ten years, from 1814 to 1823, and the succeeding ten years, exhibits a more striking and gratifying difference; the first period giving for annual home consumption 1,580,616lbs., and the last ten years 3,651,810lbs., being an increase of 131 per cent.

On the authority of Mr. Winkworth, I state the number of persons employed in England in the silk trade in 1823 at 500,000; and at the present moment there are probably 700,000 engaged in it. Leaving these details for the present, let us now proceed to the examination of insects producing silk.

The chief insects which produce silk are ichneumons, spiders, and moths. My friend Mr. Stephens will this evening exhibit to your notice a specimen of ichneumon-silk; and as it is more likely to prove an object of curiosity than utility, I pass on to spider-silks.

Several genera of spiders produce silk of various strength and qualities, such as the gossamers, and our domestic species, as well as many others. In France, Monsieur Bon had gloves and stockings manufactured of it: sufficient experiments, however, have not yet been made to ascertain the quantity and qualities of spider-silk.

If in Rome the whimsically extravagant emperor Heliogabalus collected 10,000lbs. weight of spiders, as a vain display of power, surely in this metropolis we might collect a sufficient quantity of cobweb to perfect any experiments on a silk likely to be as strong as that obtained from *Bombyx Mori,* and probably less impervious to wet; a silk, however, not likely ever to be much in vogue, from the natural antipathy which prevails against spiders, from the difficulty and expense in collecting the web, and the impracticability in breeding spiders in any numbers, arising from their voracious and predatory habits: but the cocoons might be gathered and unwound. Abandoning our indigenous webs, such as float over our fields, as well as those which hang in dusky wreaths in garrets and in cellars, we may naturally expect to meet with exotic and tropical species which yield silk worth attention. It is probable that the cylindrical sacks of the gigantic *Mygale* may be advantageously collected, as the cocoons equal in size large walnuts, in one nidus of which 100 young ones have been discovered: it is reported, also, that some kinds of web are so strong that birds are entangled in the meshes, and that their webs oppose a certain degree of resistance even to man himself. In concluding my remarks on spider-silk, I would recommend that attention be directed to the silk obtained from

Epeira clavipes, **a spider abundant in Bermuda: fine specimens of its silken cocoon may be seen at the British Museum; and other species of the same genus also are deserving of attention.**

MOTH-SILK.

The principal Moths producing silk belong to the genera *Clisiocampa*, *Bombyx*, and *Tinea*. The *Bombyx Mori* (the proper type of the genus) yields it in great abundance: this species has become naturalized in the fairest portions of the globe.

As it appears from the statistical details that silk is so intimately connected with our commercial and manufacturing interests, it is evidently worth while, for the prosperity of those interests, to recommend its increased cultivation; and really, if ever there was a period when its cultivation could be carried on with increased success, it is the present moment. Look at our Indian possessions, in the full enjoyment of peace: the English, ruling these extensive territories, might induce the natives to grow (if I may use the term) any quantity of silk, sufficient to glut all the markets of Europe. In these regions there are generally eight successive silk crops: some authorities assert even more. Extending, moreover, our views to China, as the trade with that country is now thrown open to British capital, enterprise, and industry, we may naturally expect that a stimulus may be applied there to its increased production. Abandoning for for the present, however, foreign produce, it remains to state the possibility of growing silk in England; and this part of my subject requires a thorough investigation. Prussia, Bavaria, and even Northern Russia, whose climates are not superior to our own, grow annually large quantities of silk; and why does not England do the same? The answer is, the price of labour is here too high; secondly, the experiments tried have already failed. Notwithstanding these assertions, I think that it is possible to grow silk in England, and grow it even with success and profit. To meet these objections I would suggest, first, that we ought to breed silk-worms in hothouses throughout the year; and, secondly, that the Pavonia Moths of Europe and other countries, as well as the Atlas Moths of Asia, should be reared in like manner. It has already been remarked, that several crops are obtained in the East within the year; and why may we not also expect in England several, by means of breeding the worms in hothouses. In India the longest period for a generation of silkworms appears to be forty days: even allowing fifty days in England for a generation, we may then expect seven crops of silk. If we only obtain four, that is double the number produced in Italy, where they annually rear but two. I need now scarcely add, that four crops will no doubt repay the speculator for rearing silk. To reduce, however, his expenditure as much as possible, I would recommend him to feed the silk-worm with lettuce instead of mulberry-leaves; 1st, as there is less expense in the cultivation; 2ndly, as the lettuce can be grown cheaply in cucumber-frames during the winter months; and, lastly, as the quality of the silk does not depend so much on the *quality* of the *leaf* as it does on the *degree* of temperature in which the worm is reared, I would strenuously recommend the lettuce. Should the food of the mulberry-tree, however, be preferred to the lettuce, we can still adopt the discovery of Ludovico Bellarde of Turin. His plan consisted in giving the worms the pulverized leaves of the mulberry-tree slightly moistened with water: the leaves were gathered in the previous summer, dried in the sun, reduced to powder, and then stowed away in jars for the winter food, or till the tree was in full foliage. Repeated experiments made by Bellarde prove that the worm preferred this kind of food to any other, as they devour it with the greatest avidity. To reduce still further the expenditure, old men, women and children might be employed in feeding the worms, as is the case at present in India: indeed, might not the poor in the workhouses be rendered available, thus affording them amusement and profit?

With regard to rearing other silk-moths, I am well convinced that the *Pavonia minor* might be propagated to any extent in this country, as the larva are general feeders; probably the Lacquey Moths might also be reared with success; the larger *Pavoniæ* of Europe and other countries should also be tried. But a great object would be to import the eggs and breed the Atlas Moths in England, which have already yielded a fine silk well worthy the attention of the manufacturer of Great Britain.

As there is not time at present to enter into the merits of the Tusseh, Arrindi, Bughy and Kolisurra Silk-worms of India, I merely mention the chief writers on this subject, viz. the celebrated James Anderson, Dr. Roxburgh, General Hardwicke, and Colonel Sykes; the two last, I am happy to say, are members of this Society, and I am sure will most willingly give all assistance in their power towards the attainment of so desirable an object as that of rearing silk in this country*.

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* Should the first attempts fail, eventually there is every reason to believe that success must follow perseverance, as it has already done in other countries. Till that wished-for period arrives, I would earnestly recommend not only the increased cultivation of silk in India, but in all our colonies, most particularly in New Holland. At the Cape of Good Hope, at the Mauritius, at Malta, at the barren rocks of St. Helena, the silk-worm has been introduced with partial success; and from those countries may we not in future calculate on some increasing produce?

In concluding these remarks, I would suggest the formation of a Committee to investigate all that relates to silk. Let the silk manufacturer learn that the Committee is disposed to give him all the assistance in its power, that it is equally desirous of his advice and observation; let the mechanic learn that we need his practical aid, on which he alone can give us useful assistance, A Report, emanating from this Society, embodying in it the opinions of the manufacturer, the mechanic, and entomologist would do some good. If the object of producing silk in England fail altogether, we shall still have the merit of meaning well: should it succeed, however, thousands of our poorer countrymen will find employment and reap the benefit.

XXVIII. *Remarks on some Mechanical Peculiarities noticed in a Spider's Web observed at Wandsworth, Surrey. By* W. W. SAUNDERS, *Esq., F.L.S., &c.*

[Read March 2, 1835.]

IN vol. v. page 689, of Loudon's Magazine of Natural History is an account of some Geometrical Spider's webs, observed by Mr. Spence in the Giardino Publico at Milan. The singularity of these webs consisted in their being only suspended at two of the general points of support, and being balanced by a small piece of gravel, dead leaf, &c. at the third. No such webs as these having been previously observed in Britain, so far as I am aware, the object of the present short communication is to describe, and offer some remarks on, one which I noticed last season in my garden at Wandsworth, proving that our spiders are not backward in that ingenuity which Mr. Spence shows the Italian spiders to possess.

On March the 30th, 1834, I observed a Geometrical Spider's web hanging from a projecting ledge of woodwork, which was about four feet from the ground. The web, as usual, was in a triangular framework, the two upper points of support being fixed to the ledge just mentioned, and the third bearing a small piece of gravel, which weighed full six grains. The pebble had been raised rather more than eighteen inches from the ground, and hung, gently moving with the web at every breath of air. The pebble is oval-shaped, flattish, and was attached endways to the cable of support, so that the wind made it whirl rapidly on its axis, as well as vibrate to and fro.

The way the cable was attached to the pebble demands attention, as therein is shown great stability and ingenuity. About half an inch above the pebble the cable forked, and each branch of the fork, a little lower down, again and again forked, so that the attachment to the pebble was in eight places, thus affording great strength and firmness. There was about a foot of cable from the lower angle of the frame-work of the web to the pebble, and thus there was formed a sufficient length of pendulum to ensure a moderately long beat or oscillation. When I first observed the web it was in perfect order, and apparently newly constructed; and I made diligent search after the constructor, but without success. I let the web remain, with the hopes of discovering the spider; but during the afternoon and night of the 30th some showers of rain accompanied with wind occurred, which much broke the web, so that the next morning I took the pebble from it, and pulled down what remained, to see whether the spider, which I thought must be at hand, although I could not find it, would construct such another. By the morning of the 1st of April another web was constructed, similar in every respect to the former, excepting that no pebble was used as a balance, the lower point of support being attached to an angle of a large piece of gravel firmly imbedded in the ground; and in this state the web remained for some days, after which I took no further notice of it. The spider always escaped me, but I have little doubt that the webs were constructed by *Epeira diadema,* as that species of spider is very common in our garden. Some may argue that the second web was not constructed by the same spider that made the first, as I have no direct evidence of the fact; but the circumstantial evidence of its being immediately constructed in the same place, and of the same shape, and the known propensity of spiders to occupy the same spot over and over again with their webs, sufficiently establish the fact in my mind. Now, although one might be led to suppose that the pebble was intentionally used as a balance by the spider,—and I should be anxious to give it all due praise for its ingenuity,—yet on considering the circumstance of the second web being constructed, as they usually are, without a pendulum, I cannot but suppose the first to have resulted from chance, and not from any foresight in the spider; for the use of a pendulum in the case under consideration, did not overcome any difficulties that I can perceive, and the spider was not prompted to make such another, showing that the second, although constructed in the same place exactly, was found to answer as well as the first. In this view I am glad to be borne out by so high an authority as Mr. Spence, who considers that the balancing of the webs of the Italian spiders was also the result of chance, as detailed in the paper before referred to. The raising of the pebble to the height of a foot and a half, as observed by myself, and far higher according to Mr. Spence's observations, is certainly a great and wonderful work for a spider, and displays its strength and ingenuity. I am not aware of the weight of a full-grown *Epeira diadema*, but it must be very much less than six grains, the weight I have ascertained it raises, and therefore the means employed to raise so great a weight in proportion to itself, must be an interesting matter of inquiry, but is involved in many difficulties. I think the pebble must be raised by some ingenious means which the spider possesses of shortening the lower cable of attachment, as diminishing the length of any of the upper part of the web could never raise the pebble to the height it has been observed to be raised. Allowing this to be the case, the lifting of the pebble can be accounted for thus: The spider in having unintentionally fixed its lower point of attachment to a small loose pebble, may detect that it is unsteady, and pulling at the cable to tighten it, probably raises the pebble off the ground, and so continuing its efforts to remedy a defect, at last desists, finding the task impossible, and the pebble remains suspended in the air. This is of course a mere supposition, and the spider, to accomplish it, must have very great strength,—greater, perhaps, than many will allow. A fact, however, pointed out to me by Mr. Westwood in No. xii. page 454, of the Edinburgh Journal of Natural and Geographical Science, proves that spiders have great strength, and display considerable ingenuity in raising weights. The fact is related by the Rev. W. Turner; and he states, that a sprig of Laurastinus being put into a tumbler with an *Aranea extensa ?*, the latter raised it up into the tumbler, and kept it suspended there by means of lines of web. Here, certainly, the difficulty does not appear to have been so great as in the raising of a small pebble by a single line; however, as it tends to illustrate the strength and ingenuity of spiders, I have mentioned it. The contents of the present paper appear so insignificant, that I should not have thought of troubling the Society with them, had not I wished to gain information on the subject from some of the experienced entomologists who are members of it, and who will perhaps give much valuable information on the subject.

XXIX. *Observations upon the Habits of* Copris Midas. *By Lieut.-Colonel* W. H. Sykes, *F.R.S., &c.*

[Read January 5, 1835.]

In submitting to the examination of the members of the Entomological Society two specimens of the *Copris Midas*, together with their receptacles in the pupa state, it may be acceptable to the Society to be made acquainted with the circumstances connected with their development under my observation.

At Poona, in the month of June, 1826, some of my palankeen-bearers were employed in loosening with pickaxes a friable and decomposing mica and greenstone, called *mohrum*, for the purpose of spreading it on my garden-walks instead of gravel. While thus employed, they turned up with their pickaxes, from some depth below the surface, four hard perfect balls. At first they considered them stone cannon-shot, the Poona cantonment and and its immediate neighbourhood having been the site of two great battles; but observing that the pickaxe had injured one of the balls, and that it was hollow, they brought the whole to me. I immediately satisfied myself that they were of compact clay, well kneaded up with comminuted grass and very minute pebbles, forming, in fact, a well-digested mortar. They were two inches in diameter, and perfectly globular, and without hole, cicatrice or fissure. The injured ball contained an amorphous animal mass, which I immediately pronounced to be the pupa of an unknown species of insect,—at least unknown to me. On removing the pupa from the broken ball the crust was found to consist of two coats; the interior surface was quite smooth, and formed of finer clay, much more elaborated than than the external coat, which was somewhat rough. The diameter of the hollow within the ball was $1\frac{7}{10}$ths of an inch; the thickness, therefore, of the crust was $\frac{3}{20}$ths of an inch. Another of these balls had its chamber $1\frac{6}{10}$ths of an inch, and the crust was $\frac{2}{10}$ths of an inch thick. To ascertain the insect proprietor of these curious domiciles, I placed two of the balls in a tin box, and continued for some months to watch them with attention; but my patience being wearied out, I abandoned further care of them, and put the box away. The third ball I gave to a lady, who, despairing of any change taking place, after many months' observation, broke it, but found the pupa inside quite fresh. Thirteen months had passed away, and I had forgotten the balls, when, on the night of the 19th of July 1827, being in my study, I heard a low scratching sound.

It was some time before my ear directed me to the tin box containing the balls, which stood upon a bookcase. It was clear an insect was endeavouring to liberate itself. This object not being effected at one o'clock in the morning, I retired to rest. The scratching continued the whole of the 20th, and until I went to bed. Previously to retiring for the night, to facilitate the exit of the creature, I dropped water upon the ball to soften the very hard and compact crust. At sunrise on the morning of the 21st, I found the fine *Copris* at liberty, 1¼ inch long, and $\frac{8}{10}$ths of an inch wide, now exhibited to the Society. It must have been thirty-four hours at work; had been thirteen months in the pupa state, in my possession; and may have been thrice the time in the same state before it was found by my people. The second ball remained unaltered, nor were there any indications whatever of approaching development in the tenant. It was allowed to remain in the tin box, and looked at after very short intervals of time. It was, however, the 4th of October ere the second specimen of *Copris*, now before the Society, worked its way out from its prison, and its labour must have been infinitely more severe than that of its predecessor, as I did not give it any aid by softening the crust of the ball with water. It had been sixteen months in my possession in the pupa state. Having been found in the same locality with the preceding specimen, we may infer, with a probability of truth, that the larvæ enclosed themselves (or were enclosed) at the same period; and we nevertheless see that, under precisely similar circumstances, the perfect development of one specimen preceded that of the other by seventy-five days.

I will scarcely speculate upon the manner, the *modus operandi*, in which the grubs contrived to imprison themselves within perfect hollow balls of prepared mortar, of two different kinds in the different coats, for the subject is not satisfactorily explicable to me. Are we to understand that the larvæ prepared their balls with workman-like accuracy and perfect symmetry, leaving a hole to get in at, and that they took in with them only such a quantity of prepared clay as should suffice, and no more, for the exact sealing of the hole by which they entered? or are we to understand that a small family of the larvæ laboured to enclose individuals successively, until there remained but one, which, unable to enclose itself, became a sacrifice for the good of the community? The larvæ of the cockchaffer, stagchaffer, and other beetles, scoop out hollows in clods of earth, and the ball of the latter is described to be larger than a hen's egg; but I do not learn whether or not it be without hole or fissure. The larva itself is said to remain in that state for two or three years or more ere it buries itself in its ball: its pupa remains in that state only three months. The larvæ of Lepidopterous insects either spin coverings for themselves out of the produce of their own body, or form canopies for concealment by connecting fragments of dried leaves or other matters together by running silk threads over them; but the *Copris Midas* has to collect its own materials, elaborate them, and then bury itself in them in a ball in some mysterious manner.

XXX. *Observations on Succinic Insects. By the Rev.* F. W. Hope, *F.R.S., Pres. Ent. Soc., &c.*

[Read March 3, 1834.]

At our last meeting * some few observations were read on mummied insects in a tolerable state of preservation after the lapse of two or three thousand years. I now wish to draw your attention to insects of much greater antiquity, insects which for aught I know may vie in antiquity with the "great globe itself." I allude to those which are contained in amber. It requires no very warm imagination to paint in glowing colours the overwhelming productiveness of the earliest ages: enough may be gathered for our present purpose from the imagery of the poet, in describing a period when the sun with greater power than at present shot his rays on the gladdened forest, when every tree and shrub distilled liquid amber from their branches, and when the whole air teemed with the countless myriads of insect population. It may require however the wand of the fairy or magician to account for the sudden and happy inhumation of these insects in their amber tenements; I say happy, for in most instances they appear not to have struggled to avoid their destiny, but seem fresh and beautiful as if still animate with life. It is not my intention here to propound a theory; this I most willingly leave to others: some speculations have enjoyed an ephemeral reputation, and then fell without any very satisfactory results being obtained from them, and others will probably do the same. I shall therefore proceed at once to make some remarks on the substances which contain insects, give the tests by which they may be known †, and then place before you a Synoptical Table of such genera and species as have fallen under my notice. The only recorded bituminous and resinous substances, I believe, which contain insects are the following, namely, amber and copal (Observe, I do not here include the *Crustacea* or *Arachnida*). It is not unlikely however that eventually they may be discovered in coal ‡, bituminized shale, and in the honey-stone. Amber is occasionally met with in the gravel-pits near London, and I have seen specimens which were found in Hyde Park. At Aldborough on the coast of Suffolk, after a raking tide, it is thrown on the beach in considerable quantities, along with masses of jet, and if not torn from the bed of the sea may have been washed from the Baltic, where there are regular mines of it as well as in Spain*. Amber is also abundant on the shores of Sicily and the Adriatic sea. By eminent geologists it is considered as antediluvian, and of its vegetable origin there can be little doubt. The trees which produced the amber and the insects which frequented them are not known to exist. Probably the climate by degrees became colder and destroyed the vegetation and drove the latter to seek a more southern and genial region, or inundation may have overflowed the woods and buried all beneath a mass of waters. The celebrated Berendt gives us his opinion that the geographical focus of the amber wood was in the bottom of the Baltic, in the neighbourhood of what is now called Samland near Pillau. Every gale from the north still throws up, as it did a thousand years ago, its masses of amber on the Baltic shores; and it is worthy of remark that each point of the coast receives a particular kind of amber, so peculiar that practised cutters of it are able, when looking at a rough piece, to decide whether it came from a quarter to the east of Dantzig, or from the west on the coast of Pomerania, the produce probably of different trees. The places therefore where the amber was originally produced and subsequently immersed appear to be identical. Had it been carried thither by diluvium or alluvium the different kinds must have been commixed, but that is evidently not the case, as is well attested by Mr. Berendt and others. From an examination of the fossil wood (in the British Museum) obtained from the Prussian amber-mines, it appeared to me mostly to resemble fir, and as the major part of the insects found in amber are Xylophagous, I did expect to find some species which we meet with at present on the fir. Up to the present moment however I have not succeeded. Berendt informs us that the wood, blossom, fruit and needle *leaves* of the *Coniferæ* have been found in amber,—the latter very rarely,—yet never corresponding with any existing trees; and although the leaves appeared to differ greatly from all known species, he thinks himself justified in ascribing them to the genus *Pinus*. And in a letter lately received from Mr. Berendt he informs me that the anatomico-microscopical examination of the wood places it beyond a doubt that the amber-tree was a *Pinus*. What the species of the true amber-tree really was cannot be known, but the above writer informs us the *Pinus Balsamea* approaches nearest to it in appearance, and he then states his opinion that the tree no longer exists.

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* Vide Journal of Proceedings, p. xi.

† See Supplementary Observations by Dr. Ure, annexed.

‡ I have subsequently learned that some have been found in coal near Bonn. Vide Proceedings Geological Society.

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* It is much more likely that amber inclosing insects should be thrown on the shores of England than recent "exotic beetles, which beetles were said to have revived after having been long drenched in salt water." Meeting with this passage in a work of such eminence as Professor Lyell's Principles of Geology, I inquired of the author what these exotics were, and received for answer specimens of *Calosoma Sycophanta*, an insect found in Essex, Norfolk, Cheshire, and other counties in England. Here the entomologist comes in to aid the geologist.

With regard to the insects in amber I state them to be altogether extra-European; many of them belong to tropical and temperate climes, while some approach South American and Indian forms: I know of no existing species, however, to which they are analogous; they are therefore probably extinct. I arrived at this conclusion solely from the examination of a variety of specimens belonging to the collections of Germany and England, and was therefore greatly pleased on finding afterwards that Jussieu, Germar and De Jean maintain the same opinion in their writings. From Mr. König of the British Museum I obtained the intelligence that Dr. Leach and Mr. MacLeay were of the same opinion. We have then the united testimony of some of the first entomologists of Europe, whose collections are proverbially rich, whose acquaintance with insects and whose capability of judging on this point cannot be doubted. Here we have the entomologist and botanist arriving at the same conclusion in their respective researches: first, that the substances inclosed in amber (whether animal or vegetable) agree with no existing species; and secondly, the species of plants producing amber are no longer in existence, or if they do exist at present they have escaped the notice of some of the most laborious and accurate naturalists of Europe. We may therefore conclude with the geologist that amber is of very remote antiquity, and that which is contained in it is coeval with the envelope.

Before I place before you the Synoptical Tabular Arrangement of the genera and species of amber-insects, I ought to state that in some instances * amphibia and shells have been inclosed in them by art; an example of which may be seen in the British Museum, where a toad has been inserted, but so badly managed that few can doubt the attempt at imposition: others have introduced shells, with apparent success; the attempt has also been made with insects, but has generally failed. I am ready to allow that in some instances deceptions have so far succeeded as to make their originality doubtful to the inexperienced entomologist; but even allowing this it will not affect the antiquity of the major part, which are evidently natural.

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* Brydone states that in Sicilian amber lizards are occasionally found, and Mr. König informs me also that there is in the British Museum the tail of a lizard inclosed in amber which is evidently not artificial.

With regard to lizards and shells being found in amber there is now little doubt of its truth ; making even ample allowance for modern trickery and imposition (of which indeed there is no lack,) we have still the testimony of Pliny, who states : "Liquidum primo distillare argumento sunt quædam intus translucentia ut *Formicæ* aut *Culices Lacertæ*que quas adhæsisse musteo non est dubium et inclusas indurescenti." Vid. lib. xxxvii. cap. 3. At St. Gard, in France, amber is found in a bed of fossil wood mixed with numerous specimens of shells denominated *Ampullaria*, one species of which is named *Ampullaria Faujasii* ; and other shells of the genera *Paludina* and *Helix* have also been discovered imbedded in the same substance. For a moment we must refer to the geologist for his information. On the authority of Mr. De la Beche I state that the Prussian deposit of lignite and amber belongs to the tertiary rocks, and its place is probably above the supracretaceous group ; little however is satisfactorily known at present respecting it. It is not unlikely that the amber of Sicily may belong to another period ; and as scarcely any specimens from that quarter * have come under my notice, I cannot state that the genera contained in them approach the forms of temperate or tropical climes.

It was my intention here to have added Tables of the genera of amber-insects which have fallen under my observation ; and I only refrain from doing so at present from a desire to make them as perfect as possible, expecting shortly to receive from Prussia many important additions to those I am acquainted with. There is evidently no want of species of amber-insects, although they are not so numerous as those contained in animé †. The celebrated Swammerdam had in his collection 166 species of *Coleoptera*, and Frisch more than 200 ; Berendt possesses more than 1000 specimens, among which however there are many duplicates. The number of described genera already recognised by me amounts to 83 ; there are also various others as yet uncharacterized, several of them belonging to temperate climes, and several which are probably tropical. The major part of the insects exhibit a close resemblance to existing species, and can be satisfactorily classed under published genera. That any of those which are found in amber are identical with existing species

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* Since writing this account I have received a letter from Mr. Berendt giving a concise account of Sicilian amber. He states that it scarcely differs from that of the Baltic, except that opalescent pieces frequently occur in Sicily, which are rarely found in Prussia.

† [At the request of the Publication Committee the Tables of amber-insects in their present state have been added at the end of this Memoir.—Sec. E. S.]

I do not believe, for out of many hundred specimens, nay I may say thousands, which have fallen under my notice, none have yet induced me to change my opinion that they are otherwise than of the tertiary period. If the reader desire further information on these points, let him consult the elaborate writings of Schweigger and Dalman, and the eloquent Berendt. In the pages of the former he will find a scorpion figured from Prussian amber, which is a genus properly a native of warm climates, certainly never occurring so far north as Dantzig. A new genus of spiders described by the same writer approaches in its characters a southern and probably an American type. I may add also that *Formica Surinamensis*, or at least one like it, has already been recognised in amber; and that some insects of the following genera, viz. *Gyrinus*, *Saperda*, *Hispa*, and *Lamprosoma*, evince a South American relationship, while the *Blattidæ* and some of the *Hymenoptera* resemble closely Oriental species. The presence of *Phryganea*, *Ephemera*, *Panorpa*, and *Leptura*, and many other genera indicates a northern climate. From the above discrepancies I abstain at present from entering more largely into the geographical investigation of amber-insects, and reserve it for some future paper; but from what has already been adduced, may we not conclude that the climate and temperature of Europe have undergone considerable change? The above examples of tropical insects sufficiently testify that the amber-tree did not vegetate under a climate such as Prussia now enjoys, but in a warm region. I trust the above notices will afford a sufficient stimulus to induce others to take in hand a subject replete with interest; a subject embracing in its scope not only the changes of temperature and climate which our globe has undergone, but also the consideration of the geographical distribution of insects and plants, by which alone we can arrive at any satisfactory conclusion respecting them. Let then the geologist boast of his Mastodon and Megatherium, his wondrous Saurian Reptiles, and numerous genera of unknown beings; the entomologist also prides himself on his *Amber Insects*, rivalling the former in antiquity, and surpassing them in beauty and in colouring. Let the former add room to room, gallery to gallery, and fill a city with his relics and his casts, the latter may also rest contented with his stores, less bulky indeed though not less interesting. The earth is a study for them both, an inexhaustible field of inquiry, and it may be matter of question which will most contribute to illustrate the condition and character of its earliest tenants.

Chemical Observations on Amber, Animé, and Copal, above referred to.

By Andrew Ure, *M.D., F.R.S.*

Amber, specific gravity	1·080.
Animé	1·054.
Copal	1·071.

Amber hardly if at all softens when heated in a glass matrass over the flame of a spirit-lamp, but shrinks, darkens in colour, and exhales white fumes of an ambrosiacal odour, which, when condensed in a receiver, are found to consist of succinic acid and oil. It does not dissolve in alcohol, or in caoutchoucine, but is rendered friable by infusion for some time in a mixture of these two liquids.

Animé is, like amber, remarkable for the number of insects imbedded in it. When heated in a glass retort over a spirit flame it softens, and by skilful management of the heat it may be fused without burning. In this state it exhales copious vapours of an ambrosiacal odour, which being condensed in water and tested, afford evident traces of succinic acid. Animé is very transparent; its colour is a clear brown with a yellow tinge. Alcohol does not act upon it, and caoutchoucine very slightly; but a mixture of the two in equal parts, even in the cold, speedily penetrates its substance and converts it into a soft gelatinous matter, like bright and somewhat thin calves'-feet jelly. By this means the impasted insects may be readily extracted entire. But after long digestion in the above compound solvent, it does not melt down into a liquid varnish, even though heat be applied.

Copal is distinguishable from animé by a faint opalescence, and a pale greenish yellow tinge. Caoutchoucine acts very feebly upon it as well as alcohol; but a mixture of the two speedily dissolves it in the cold into a rich homogeneous varnish. When heated in a glass retort over a spirit-flame it readily melts into a very fluid consistence, and when further urged by the heat it boils with little explosions; a viscid oily matter distils over. After continuing the process for some time the liquid copal begins to blacken; but it affords no succinic acid on testing the distilled fluid with the greatest care.

LIST OF SUCCINIC INSECTS.

COLEOPTERA.

Family.	Genus.	Species.	Authority.	Substance.	Locality.	Collection or Cabinet.
Cicindelidæ.	Cicindela.	One.	Berendt.	Amber.	Prussia?	Halle.
Carabidæ.	Lebena	resinata.	Germar.	Amber.	....	......
	Lebia.	One species.	Berendt.	Amber.	....	......
	Lebia.	3 new species.	Hope.	Animé.	India?	Mr. Strong, &c.
	Planetes?	One, new.	Westwood.	Animé.	India?	Mr. Westwood.
	Helluo?	One.	Westwood.	Animé.	....	Mr. Westwood.
	Carabus.	One.	Berendt.	Amber.	....	......
Gyrinidæ.	Gyrinus.	....	Berendt, Hope, & Sendelius.	Amber.	....	......
	Osorius.	N. s.	Westwood.	Animé.	....	......
Staphylinidæ.	Staphylinus.	....	Hope.	Amber.	....	......
	Sunius?	N. s.	Hope.	Animé.	Prussia.	Mr. Strong.
Clavigeridæ.	Articerus.	Dalmannianus.	Dalman.	Animé.	....	Dalman *olim.*
	N. g.	pectinicornis.	Hope.	Animé.	Prussia.	Dalman *olim.*
Pselaphidæ.	N. g.	2 species.	Hope.	Animé.	....	Hope.
Lampyridæ.	Lampyris.	2 species.	Hope and Berendt.	Animé & amber.	Prussia.	Mr. Strong.
	....	....	Hope.	Amber.	....	......
	Lycus.	N. s.	Hope.	Animé.	Prussia.	Mr. Strong.
	N. g.	pectinicornis.	Hope.	....	....	......
Cleridæ.	Clerus	nigripes.	Dalman.	Animé.	Prussia.	Dalman *olim.*
	Tillus.	12 species.	Hope.	Animé.	Prussia.	Mr. Strong.
	Opilus.	....	Hope.	Amber.	....	......
	Thanasimus.	N. s.	Hope.	Amber.	Prussia.	Mr. Strong.
	Notoxus.	....	Hope.	Amber.	....	......

COLEOPTERA (continued.)

Family.	Genus.	Species.	Authority.	Substance.	Locality.	Collection or Cabinet.
Nitidulidæ.	Nitidula.	2 n. s.	Hope.	Amber?	Prussia.	Mr. Strong, B. M.
	Strongylus.	....	Hope.	Amber.	....	......
	Cateretes.	....	Hope.	....	....	Mr. Strong, B. M.
Engidæ.	Cryptophagus.	....	Hope and Berendt.	Amber & animé.	....	......
	Silvanus.	....	Berendt.	Amber.	....	......
Erotylidæ.	Erotylus.	N. s.	Hope.	Animé.	....	Mr. Strong.
	Eumorphus.	N. s.	Hope.	Animé.	Prussia.	Mr. Strong.
Copridæ.	Anthophagus.	2 species.	Hope.	Animé.	India.	Mr. Strong.
Melolonthidæ.	Hoplia.	N. s.	Hope.	Animé.	....	Mr. Strong.
Buprestidæ.	Buprestis.	....	Berendt.	Amber.	....	......
	Agrilus.	2 species.	Hope.	Animé.	India.	Mr. Strong, B. M.
	Agrilus.	....	Berendt.	Amber.	....	......
Elateridæ.	Elater.	1 species.	Berendt.	Amber.	....	......
	Elater, no new genera.	15 species.	Hope.	Animé.	India.	Hope, Strong, &c.
	Eucnemis?	1 new.	....	Animé.	....	......
	....	....	Hope.	Amber.	India.	Hope, Strong, &c.
Lampyridæ.	Lampyris.	....	Hope.	Amber.	....	......
	....	N. s.	Hope.	Animé.	....	Mr. Strong.
	Lycus.	....	Berendt.	Amber.	....	Mr. Strong.
Diaperidæ.	Hypophlæus?	N. s.	Berendt.	Amber.	....	Mr. Strong.
Helopidæ.	Helops.	N. s.	Berendt.	Amber.	....	Mr. Strong.
Cistelidæ.	Cistela.	2 species.	Berendt.	Amber.	....	Mr. Strong.
Serropalpidæ.	Orchesia.	1 new.	Berendt.	Amber.	....	Mr. Strong.
Mordellidæ.	Mordella.	2 species.	Berendt.	Amber.	....	Mr. Strong.
	Mordellina	inclusa.	Germar.	....	....	Halle.

	Ripidius	megalophus.	Sweigger.	Animé.	....	......
	....	pyrrhocephalus.	Dalmann.	Animé.	....	Dalman *olim.*
	Anaspis.	....	Berendt.	Amber.	....	......
Anthicidæ.	Anthicus.	N. s.	Hope.	Animé.	....	Mr. Strong.
Bruchidæ.	Bruchus.	N. s.	Waterhouse.	Animé.	....	Hope.
Curculionidæ.	Rhinosimus ?	....	Hope.	Animé.	....	......
	Anthribus.	2 species.	Hope.	Animé.	....	Strong.
	Cleonis.	....	Sendelius.	Amber.	....	Sendelius *olim.*
	Balaninus.	....	Hope.	Amber.	....	......
	Prionopus	acanthomerus.	Dalman.	Amber.	....	Dalman *olim.*
	Curculio.	One.	Berendt.	Amber.	....	......
Lucanidæ.	Platycerus.	....	Berendt.	....	Prussia.	......
Paussidæ.	Paussus	cruciatus.	Dalman.	Animé.	....	Dalman *olim.*
Brenthidæ.	Brenthus.	2 species.	Hope.	Animé.	....	Mr. Strong.
	Platypus	flavicornis.	Germar, Hope.	Animé & amber.	Brazil ?	Germar.
Bostrichidæ.	Bostrichus.	One.	Berendt.	Amber.	....	......
	Hylesinus.	One.	Berendt.	Amber.	....	......
Curculionidæ.	Calandra.	2 species.	Hope.	Animé.	....	Hope.
	Piazorus	One.	Westwood.	Animé.	....	Strong.
Xylophaga.	Platypus.	Many species.	Westwood.	Amber & animé.	....	Hope.
	......	....	Berendt.	Amber.	Prussia ?	......
	Hylesinus	electrinus.	Germar.	Amber.	....	Germar.
	Hylurgus.	....	Hope.	Amber.	....	......
	Apate.	N. s.	Hope.	Animé.	....	Strong.
	Sylvanus.	....	Berendt.	Amber.	....	......
	Trogosita.	N. s.	Hope.	Animé.	... .	Strong.
	Cucujus.	N. s.	Hope.	Animé Amber ?	....	Strong.
Cerambicidæ.	Cerambyx.	2 species.	Hope and Berendt.	Animé & amber.	....	Strong.
		Dichoptera.	Dalman.	....	....	Dalman *olim.*
	Callidium.	One.	Hope.	Animé.	....	Dalman *olim.*
	Saperda.	....	Berendt.	Amber.	....	......

COLEOPTERA (continued.)

Family.	Genus.	Species.	Authority.	Substance.	Locality.	Collection or Cabinet.
	Clytus.	One.	Hope.	Amber.	....	Dalman *olim.*
	Stenocorus.	One.	Berendt.	Amber	....	Dalman *olim.*
Lamiadæ.	Acanthocinus.	Three.	Hope.	Amber.	....	Dalman *olim.*
	Lamia.	Several.	Hope.	Amber.	....	Dalman *olim.*
	Saperda.	One.	Hope.	Amber.	....	Dalman *olim.*B.M.
Lepturidæ.	Leptura.	One.	Berendt.	Amber.	....	......
Crioceridæ.	Auchenia.	Several.	Hope.	Amber.	....	Hope.
	Crioceris.	....	Berendt.	Amber.	....	......
	Criocerina	pristina.	Germar.	Amber.	....	Halle.
Cassidæ.	Cassida.	One.	Berendt and Hope.	Animé.	....	Strong.
	....	....	Hope.	Amber.	....	......
Chrysomelidæ.	Chrysomela.	Several.	Berendt.	Amber.	....	Hope.
	Chrysomela.	Several.	Hope.	Animé.	....	......
	Cryptocephalus.	Two.	Hope.	Amber & animé.	....	Strong.
	Eumolpus.	One.	Hope.	Animé.	....	Strong.
	Colaspis.	Several.	Hope.	Animé.	....	Strong.
	....	....	Berendt.	Amber.	....	......
Galerucidæ.	Galeruca.	Several.	Berendt.	Amber.	....	Strong.
	Luperus.	One.	Berendt.	Amber.	....	Strong.
	Altica.	Many species.	Berendt.	Amber.	....	Hope.
	Scirtes.	....	Hope.	Amber.	....	......
Coccinellidæ.	Coccinella.	3 species.	Berendt.	Amber.	India?	Hope.
	Coccinella.	1 species.	Berendt.	Amber.	....	......
	Phalacrus.	....	....	....	....	Hope.
Hispidæ.	Hispa.	Two or three.	Berendt.	Amber.	....	......
Dermestidæ.	Dermestes.	One.	Berendt.	Amber.	....	......

ADDENDA FROM MR. BERENDT'S MSS.

	Anobium.	....	Berendt.	Amber.		
	Cyphon.	One.	Berendt.	Amber.		
	Necycdalis.	....	Berendt.	Amber.		
	Elater.	....	Hope.	....		
	3 genera.	....	Hope.	Amber.		
	Cupes.	....	Hope.	Amber.		
	Cypha, *Kirby*.	One.	Hope.	....		
	Staphylinidæ.	3 genera.	Berendt.	Amber.		
	Lamprosoma.	....	Berendt and Hope.	... .		
	Telephorus.	....	Hope and Berendt.	Amber.		
	Malthinus.	... .	Berendt.	Amber.		
	Cantharis.	One.	Berendt.	Amber.		
	Atopa.	One.	Berendt.	Amber.		
			HOMOPTERA.			
Cicadidæ.	Cicada ?	1 species.	Hope.	Animé & amber.	....	Mr. Strong.
	Cicada.	....	Berendt.	Amber.	....	......
Cicadellæ.	Cixius.	1 species.	Westwood.	Animé.	....	Mr. Strong.
	Issus ?	2 species.	Hope.	Animé.	....	Mr. Strong.
	Aphrophora.	Several.	Westwood and Hope.	Animé & amber.	....	Hope, Westwood.
	Iassus.	....	Westwood and Hope.	Animé.	....	Mr. Strong.
	Pœciloptera.	....	Westwood and Hope.	Animé.	....	
	Ricania ?	equestris.	Dalman.	Animé & amber.	....	Dalman *olim*.
	Centrotus.	One.	Hope.	....	....	Mr. Strong.
	Cercopis.	Many species.	Hope.	Animé.	....	Dalman *olim*.
Aphidæ. (None.)						
			NEUROPTERA.			
Libellulidæ.	Libellula.	....	Berendt.	Amber.	....	......
	Agrion ?	Allied to Virgo.	Hope.	Animé.	....	Mr. Strong.
Ephemeridæ.	Ephemeridæ.	....	Berendt.	Amber.	....	......
Hemerobiidæ.	Hemerobius.	1 species.	Hope and Berendt.	Animé & amber.	....	Mr. Strong.

NEUROPTERA (continued.)

Family.	Genus.	Species.	Authority.	Substance.	Locality.	Collection or Cabinet.
Hemerobidæ.	Hemerobius	antiquus.	Germar.	Amber.	....	Halle.
Termitidæ.	Termes.	Many species.	Westwood and Berendt.	Animé & amber.	....	Hope.
	Embia	Savignii?	Westwood.	Animé.	India?	Mr. Strong.
Panorpidæ.	Panorpa.	1 new species.	Berendt.	Amber.	....	......
Psocidæ.	Psocus.	Several.	Westwood.	Animé & amber.	....	Mr. Strong.
Myrmeleonidæ.	Myrmeleon.	....	Berendt.	Amber.	....	......
			TRICHOPTERA.			
	Phryganea.	Several.	Berendt.	Amber.	....	......
	Limnephilus.	Several.	Westwood.	Animé.	....	Mr. Strong.
	Phryganeolitha	vetusta.	Germar.	Amber.	Europe.	Halle.
			HYMENOPTERA.			
Tenthredinidæ.	None.				....	
Ichneumonidæ.	Ichneumon.	Many species.	Hope and Berendt.	Amber & animé.	....	Mr. Strong, Hope.
Vespidæ.	None.				....	
Evanidæ.	Evania.	3 species.	Hope.	Animé & amber.	....	Mr. Strong.
		1 like minuta, 1	Westwood.	Animé.	....	......
		like appendegaster.	Walker.	Animé.	....	... ..
Chalcididæ.	Cynips.	....	....	Amber.	....	Hope, &c.
		Very numerous.	Hope.	Animé.	....	......
Pteromalidinæ.	Palmon.	Bellator clavellatus [capitellatus.	Dalman.		....	Dalman *olim.*
	Eupelmus.		Westwood.	Animé.	....	.....
	Ceraphron.		Walker.	Animé.	....	Hope.
	Telenomus.		Walker.	Animé.	....	Hope.
Proctotrupidæ.	Proctotrupes.	3 distinct.	....	Amber.	....	.... .

	Bethyllus.	....	Westwood.	Animé.	....	Mr. Strong.
Chrysididæ.	Chrysis.	2 species.	Hope and Westwood.	Animé.	....	Mr. Strong.
Formicidæ.	Formica.	Numerous.	Westwood and Berendt.	Amber & animé.	Prussia.	Hope, Halle.
	Myrmica.	....	Westwood and Berendt.	Animé & amber.	....	......
	Ponera.	....	Westwood and Berendt.	Animé.	....	Westwood.
Sphegidæ.	Pelopæus.	Blue species.	Westwood.	Animé.	....	Mr. Strong.
Mutillidæ.	Mutilla.	2 species.	Hope.	Animé.	....	Mr. Strong, B.M.
Vespidæ.	Vespa.	One.	Berendt.	Amber.	....	
Andrenidæ.	Andrena.	Various.	Westwood.	Animé.	....	Mr. Strong, B.M.
Apidæ.	Apis.	....	Hope and Berendt.	Animé & amber.	....	Mr. Strong.
	Trigona.	Numerous.	Westwood.	Animé.	....	Hope, Strong.

ORTHOPTERA.

Blattidæ.	Blatta.	Several species.	Germar and Berendt.	Amber.	Prussia.	Halle.
		perspicillata.	Dalman.	Animé & amber.	....	Dalman *olim.*
Mantidæ.	Mantis.	2 species.	Hope.	Animé.	....	Mr. Strong.
	Forficula.	N. s.	Hope.	Animé.	....	British Museum.
Achetidæ.	Acheta.	Several species, }	Westwood.	Animé & amber.	....	Hope.
		and larvæ. }	Sendelius and Berendt.	....	....	......
Gryllidæ.	Conocephalus ?	Larva.	Westwood.	Animé.	....	Mr. Strong.
	Gryllus.	....	Berendt.	Amber.	....	......
Locustidæ.	Acrydium.	1 species.	Westwood.	Animé.	....	Mr. Strong.
	Locusta.	One.	Berendt.	Amber.	....	......
	Tettigonia.	....	Hope.	Amber.	....	......
Forficulidæ.	Forficula.	....	Berendt.	Amber.	....	......

HEMIPTERA.

Pentatomidæ.	Pentatoma.	1 species.	Hope.	Animé & amber.	....	Mr. Strong.
Coreidæ.	Coreus.	1 species.	Westwood.	Animé.	....	Mr. Strong.
	Macrophthalmus.	1 species.	Westwood.	Animé.	....	Mr. Strong.
Lygæidæ.	Lygæus.	Several.	Hope.	Animé.	....	Hope.

HEMIPTERA (continued.)

Family.	Genus.	Species.	Authority.	Substance.	Locality.	Collection or Cabinet.
Capsidæ.	Phytocoris.	Several species.	Westwood.	Animé.	....	Mr. Strong.
Reduviidæ.	Reduvius.	Very numerous.	Westwood.	Animé.	....	Hope.
	Ploiaria.	1 species.	Westwood.	Animé.	....	Mr. Strong.
Cimicidæ.	Aradus.	....	Berendt.	Amber.	....	......
	....	1 species.	Westwood.	Animé.	....	Mr. Strong.
Notonectidæ.	Corixa.	2 species.	Westwood.	Animé.	....	Westwood.
	Notonecta?	1 species.	Hope.	Animé.	....	Mr. Strong.
	Gerris?	1 species.	Hope and Berendt.	Animé & amber.	....	Mr. Strong.
Nepidæ.	Nepa.	....	Berendt.	Amber.	....	......
Miridæ.	Miris.	....	Hope.	Amber.	....	......
Cimicidæ.	Cimex.	....	Hope.	Amber.	....	......
			LEPIDOPTERA.			
Papilionidæ.	Papilio.	....	Hope and Berendt.	Animé & amber.	....	Mr. Strong.
	Pavonia	Metis.	....	....	....	......
	Syntomis.	Several species.	Westwood.	Animé.	....	Hope and Strong.
	Tinea.	4 species.	Hope.	Animé.	....	Hope.
	Noctua.	....	Hope.	Amber.	....	......
	Sesia?	....	Hope.	Amber.	....	......
	Sphynx.	....	Berendt.	Amber.	....	......
			DIPTERA.			
Culicidæ.	Culex.	....	Hope and Berendt.	Amber.	....	Mr. Strong.
Tipulidæ	Platyura.	....	Hope.	Amber.	....	Mr. Strong.
	Limnobia.	....	....	Amber.	....	Mr. Strong.
	Ptychopteryx.	....	....	Amber.	....	Mr. Strong.
	Cecidomyia.	....	Walker and Hope *.	Animé & amber.	....	Hope.
	Molobrus.	....	....	Animé.	....	......
	Tipula.	....	Hope.	Amber.	....	Westwood.

I have much satisfaction in naming this splendid insect (which formed one of the chief ornaments of the cabinet of my lamented friend A. H. Haworth, Esq.,) in honour of its present possessor, Thomas Norris, Esq., of Ridvales, Bury, Lancashire, M.E.S.

In the majority of its characters it most nearly approaches the *Lamia ornata* of Olivier, which with several other species from Sierra Leone and Central Africa, including the *Lamia Crux niger*, Hope, and a beautiful species recently brought home by the Niger expedition, constitute a small subgeneric group distinguished by their geographical range, the exquisite brilliancy of their colours, the very prominent prosternum, and the strongly toothed mandibles, at least in one sex.

The insect above described however, although agreeing in the first two particulars, is at once sectionally distinguished by the very great length of the terminal joint of the antennæ, the much less prominent prosternum, and the unarmed mandibles. As however the distribution of the Longicornes is at present in the course of publication by one of the most celebrated French entomologists, I shall on the present occasion content myself with pointing out the characters above detailed.

P.S. Since this memoir was read M. Serville has completed his revision of the longicorn beetles without proposing a distinct genus or subgenus for *L. ornata*, *regalis*, &c. M. Percheron has however more recently proposed the genus *Sternotomis* for these species. *Gen. des Ins.* Col. pl. 16.

XXXII. *Descriptions of some new Species of Coleopterous Insects lately received from Monte Video. By* S. S. Saunders, *Esq., M.E.S.*

[Read October 6th, 1834.]

Fam. Engidæ, *MacLeay.*

Genus Languria, Lat.

Languria latipes. Plate XIV. fig. 1.

Elongata, rufo-picea, suprà viridi-cuprea, nitida, elytris obsolete punctato-striatis, ad apicem decem-dentatis, tarsisque anticis valdè dilatatis.

Long. corporis 5¼ lin.; lat. 1 lin.

Habitat in Brasiliâ circum Monte Video.

In Mus. nostro.

Descr. *Antennæ* obscuræ, graciles, articulo septimo præcedenti paulò majori, articulisque quatuor ultimis clavam magnam planam formantibus (fig. 1. a.). *Caput* depressum. *Thorax* æneo-virens, nitidus, gibbosus, anticè contractus, distinctè marginatus. *Scutellum* depressum. *Elytra* viridi-cuprea, nitida, suturâ virescente, confertissimè et obsoletè punctato-striata, anticè latitudine thoracem æquantia, posticè valdè angustiora, lateribus rectis; singula ad apicem foveâ indistinctâ, apiceque ipso obliquè truncato, dentibus ferè æqualibus quinque (exteriore vix majore) armato. *Corpus* infrà rufo-piceum. *Pedes* æneo-virentes (anticis elongatis) femoribus ad basin rufo-piceis, tarsis dilatatis (præsertim in pare antico, fig. 1. b.,) et pubescentibus.

The 4-jointed clava of the antennæ, the very dilated anterior tarsi, and the serrated oblique apex of the elytra, are the peculiar characters of this species.

Serricornes:—Sternoxi, Lat.

Eucnemides, *Latreille, Ann. Soc. Ent. Fr.* 1834.

Genus Pterotarsus, Lat.

Pterotarsus bimaculatus. Plate XIV. fig. 2.

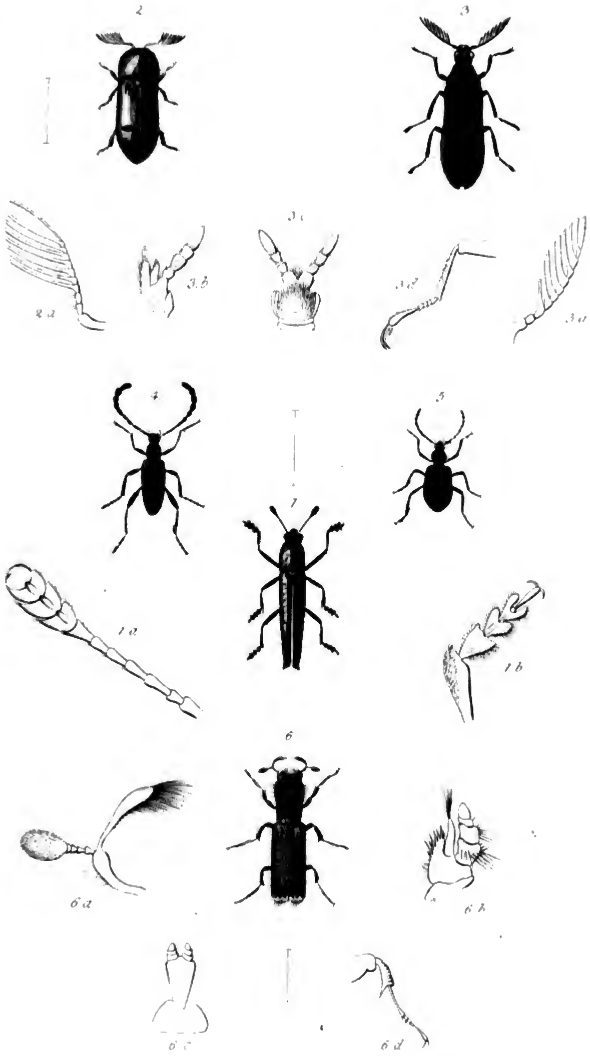
Rufo-flavus, gibbosus, antennarum flabello nigro, elytris nigro bimaculatis.

Long. corporis 5 lin.; lat. 2 lin.

Habitat in Brasiliâ, circum Monte Video.

In Mus. nostro.

Descr. *Antennæ* fulvæ, articulo basali elongato-recurvo, valdè incrassato, margine exteriori ad apicem nigro; articulis binis proximis simplicibus; reliquis longè flabellatis, flabelli laminis nigris (fig. 2. a.). *Mandibulæ* ad apicem nigræ. *Caput* demissum. *Oculi* nigri. *Thorax* et *elytra* obsoletè punctata, pubescentia; ille gibbosus, convexus, posticè lineâ centrali longitudinali impressus, in foveam transversam brevem vix ante thoracis basin terminante, margine posteriore concavo, angulis posticis acutis, depressis. *Prosternum* utrinque in canaliculam obliquam (rainure présternale, Lat.) ad antennas recipiendam profundè excavatum. *Scutellum* valdè demissum. *Elytra* obsoletissimè striata, striis basin versus fortiùs impressis, lateribus compressis; singula maculâ parvâ nigrâ, pone medium disci sig-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nata; ad apicem subacuminata. *Pedes* breves concolores; tibiis valdè dilatatis et compressis, internè fossulatis, ad tarsos contractiles recipiendis, externè à medio utrinque declivibus; tarsorum articulis 4 basalibus longè pulvillatis.

Fam. CEBRIONIDÆ.

Subfam. RHIPICERIDES, *Latr.*

Genus CALLIRHIPIS, *Latr.*

Callirhipis Hoodii. Plate XIV. fig. 3.

Obscurè niger, depressus, capitis vertice, thoracis lateribus, maculisque duabus elytrorum dorsalibus, croceo-flavis, pectore piceo.

Long. corporis 10 lin.; lat. 3 lin.

Habitat in Brasiliâ circum Monte Video.

In Mus. nostro.

Descr. Caput, thorax, et elytra, creberrimè punctata, obsoletè pilosa. *Antennæ* obscuræ, articulo basali recurvo incrassato, secundo brevi, reliquis laminas prolatas, longitudine crescentes, ad apicem recumbentes, producentibus, articulo extremo subrecto (fig. 3. a.). *Mandibulæ* unidentatæ, externè ad basin tuberculo minuto armatæ. *Palpi* saturatè picei, articulis basalibus pallidis. *Caput* subquadratum depressum, supernè nigrum inæquale, infrà croceo-flavum, fronte concolori depresso. *Thorax* brevis, croceo-flavus, disco latè nigro, anticè valdè contractus, angulis anterioribus subtervolutis, posticè latior sublatus, lineâ transversali ad basin, et foveolâ utrinque, impressis; infrà ad gulam quasi bispinosus. *Elytra* elongata, depressa, nigra, ad basin latitudine thoracem æquantia, posticè minimè dilatata, singula lineis vix elevatis quatuor (quarum suturalis ad basin furcata, et exteriores parùm distinctæ ad basin non productæ), maculâque subarcuatâ croceo-flavâ in medio latè signatâ, ad suturam non attingente, sed ad marginem exteriorem anteà usque ad basin prolongatâ. *Abdomen* obscurum pilis griseis obsitum. *Pectus* piceum. *Pedes* nigri, simplices. *Tarsi* articulo primo brevi, proximis tribus brevissimis, ultimo robustiore, valdè elongato, vix recurvato. *Ungues* magni curvati, pulvillo unico parvo corneo, subtùs hirsuto, instructi (fig. 3. d.).

I have named this fine species in honour of Thomas Samuel Hood Esq., the British Consul-General at Monte Video, by whom the insects described in this paper were kindly preesnted to me.

This insect differs from the general character of the species contained in the genus by the pale markings with which it is variegated.

In this respect it approaches the *Callirhipis bicolor* and *scapularis* of M. de Laporte's monograph, in the second number of the *Annales de la Société Entomologique de France* for the year 1834. In the former of these two species the elytra are entirely black, and the head and thorax "aurantiaca;" while in the latter the thorax is aurantiacous, with a central black spot, and the elytra are black, with a large basal aurantiacous spot dilated at the suture. These two insects (which M. de Laporte considers may possibly be varieties of the same species) are however only 7½ lines long, while mine is 10 lines, calculating 12 to the inch; but a remarkable circumstance, showing the concurrent influence of organization and colouring, here presents itself to notice, M. de Laporte having observed in both his insects "un caractère fort remarquable, qui consiste en deux petites pointes que ces insectes ont sur le bord antérieur du dessous du corselet," and respecting which he adds, "ce caractère pourrait bien être sexuel chez ces insectes," although it is not to be noticed in any of the uniformly coloured species. I had before observed in my insect a similar pair of teeth, or small projecting points, at the anterior margin of the underside of the thorax; but as the head of my specimen appeared a little injured beneath, it seemed possible that these points might be the result of accident: but on perceiving that M. de Laporte had noticed the occurrence of a similar character in the two insects before alluded to, I reexamined my insect, and finding that the character in question occurs in the exact position indicated by M. de Laporte, that it is perfectly symmetrical and uniform on each side, and considering moreover that my insect combines many other distinctive characters common to the two insects described by him as before alluded to, although at variance with those of the other species of *Callirhipis*, I have returned to the opinion which I had originally entertained, that these points were characteristic of peculiar organization. The three species further differ in general form from others of the genus, being more elongate, and having the head less deflexed, and the thorax less convex; and although the structure of the tarsi, with the claws and tubercular pulvillus, is similar to that of the typical *Callirhipis*, the general character of the three insects is so dissimilar from the rest of the genus as, in my opinion, to call for their separation under a subgeneric name: but considering the recent appearance of M. de Laporte's monograph, and the attention which he has bestowed upon the whole group, I prefer leaving the subject altogether at his disposal.

The figure given by M. Guérin of the maxillæ of *Callirhipis Dejeanii*, in the '*Iconographie*' (Insectes, pl. 13. fig. 6,), represents them very differently from what they appear in my insect; and the figure of this part given by M. de Laporte in the French Transactions, from its exact conformity with that of M. Guérin, would appear to have been copied from it. This organ, as represented in these figures, unfurnished with any terminal or lateral lobes, and having the palpi inserted upon the summit of its rounded extremity, would appear to have an unusual and unnatural construction; whereas a figure of this organ by Mr. Westwood in Griffith's Animal Kingdom, pl. 61. fig. 1. f., from *Callirhipis Childreni* of Gray, precisely corresponds with that of the maxillæ of *Call. Hoodii*, as now given, fig. 3. b., although the former species belongs to the uniformly coloured division, showing the maxillæ to be furnished with two lobes, very slender and short, and thickly covered with hairs, the outer one being biarticulate, and the inner one longer and pencil-shaped. Fig. 3. c. represents the mentum, labium, and labial palpi.

HETEROMERA, *Latr.*

Fam. CISTELIDÆ.

Genus LYSTRONYCHUS, *Latr.*

Lystronychus pulchellus. Plate XIV. fig. 5.

Obscurè violaceo niger, elytris saturatè rubris, obsoletè punctato-striatis, maculis sex nigris.

Long. corporis 4½ lin., lat. 2 lin.

Habitat in Brasiliâ circum Monte Video.

In Mus. nostro.

Descr. *Antennæ* violaceo-nigræ, graciles, apicem versus sensìm paulò crassiores. *Caput* nigrum depressum, obsoletè rugosum, lineâ ad basin impressâ. *Thorax* latior quàm longus, cordato-truncatus, convexus, niger, rugosus, angulis anterioribus haud prominulis, lateribus rotundatis, posticè contractis. *Elytra* thorace ferè duplò latiora, obscurè rubra, posticè vix dilatata, apice depresso subacuminato; singula maculis tribus nigris (quarum antica subquadrata, intermedia subrotunda, et postica minor), striisque punctatis octo, pilis suberectis griseis secundùm interstitia regularitèr dispositis, punctorumque serie ad marginem. *Corpus* infrà nigro-violaceum. *Pedes* obscuri; femoribus simplicibus.

This insect appears to agree in form of body, construction of antennæ, and simple legs, with *Helops equestris* of Fabricius, which forms the type of the genus *Lystronychus* of Latreille.

Fam. CISTELIDÆ.

Genus PROSTENUS, *Latr.* (Fam. Nat.), *Perty*, Ins. Bz.

Prostenus laticornis. Plate XIV. fig. 4.

Elongatus gracilis, viridi-cupreus, nitidus, antennis elongatis nigro-violaceis, apicem versus fortiter dilatatis, elytris punctato-striatis, pedibus piceo-ferrugineis, femoribus incrassatis.

Long. corporis 6 lin., lat. $1\frac{3}{4}$ lin.

Habitat in Brasiliâ, prope Monte Video.

In Mus. nostro.

Descr. *Antennæ* corporis longitudine nigro-violaceæ, articulis quinque basalibus plùs minùsve piceo pellucidis, ad apicem purpureis; cæteris fortitèr dilatatis, et (præter ultimum) subtrigonis, disco parùm concavis, obsoletè rugosis, lineâque vix distinctâ in longitudine divisis; articulo extremo frondiformi. *Mandibulæ* piceæ, ad apicem nigræ. *Caput* atque *thorax* viridi-cuprea, confertissimè punctata, nitida, pilis longulis erectis parcè induta; hic convexus, subquadratus, lateribus rotundatis *Elytra* elongata concoloria, nitida, ad basin elevata, humeris prominentibus, regione intermediâ subdepressâ, disco pilis nonnullis suberectis regularitèr dispositis, ad apicem crebrioribus; singula striis punctatis novem (quarum suturalis valdè abbreviata, et in proximâ prope basin demersa), punctisque nonnullis majoribus undè exeunt pili ad interstitia impressa, serieque ad marginem lateralem, anticè duplicem ordinem sequente, lateribus prope basin subtervolutis. *Corpus* infrà piceum, viridi-cupreo suffusum. *Pedes* saturatè piceo-ferruginei; femoribus incrassatis, ad basin tenuissimis; tibiis hirsutis vix recurvatis; unguibus magnis.

This insect would probably enter into the extensive genus *Prostenus* of Dejean's Catalogue, which is there placed as synonymous with *Lystronychus*; but the elongate form, shining surface of the body, greatly dilated antennæ, and incrassated femora are important characters in which it varies from the type of the latter genus (*Helops equestris*, Fabr.), so that I have felt disposed to follow Dr. Perty, who considers the two genera as distinct. As however neither characters nor type of *Prostenus* have been laid down by Latreille in the Fam. Nat., in which work alone the genus is to be found recorded by that author, it is impossible to say whether the name *Prostenus* may not have been subsequently expunged by him intentionally, and the name *Lystronychus* introduced synonymously in its place. In such case it would be well that the *Prostenus* of Perty should receive a distinct denomination in order that confusion

may be avoided; but it is also to be observed that a series of types of form may certainly be considered to intervene between the *P. laticornis* and the true *Lystronychi*; and thus the question which arises whether or not the extreme forms should be regarded as congenerous becomes a point of nice discrimination.

XYLOPHAGA.

Fam. BOSTRICHIDÆ, *Leach.*

Genus PLATYPUS, *Herbst.*

Platypus (Tesserocerus) *insignis.* Plate XIV. fig. 6.

Cylindricus, piceus, capite thoraceque nigricantibus, elytris rufopiceis, posticè obscuris.

Long. corporis 4 lin., lat. 1¼ lin.

Habitat in Brasiliâ circum Monte Video.

In Mus. nostro.

Descr. Antennæ piceo-flavæ, difformes, sex-articulatæ, articulo primo longissimo recurvo, infrà piloso, ante medium geniculato, et pro frontem insignitèr recurvato, apicem versus dilatato deflexo, subtùs ciliato; articulis quinque reliquis in primum ad geniculam obliquè insertis, 2—5 brevibus (magnitudine decrescentibus), ultimoque maximo, complanato, subrotundo, patelliformi, pilis (nisi basi) obtecto (fig. 6. a.). *Caput* nigrum, pilis longulis fulvis ad frontem prosistentibus densè vestitum. *Thorax* niger, maculis duabus contiguis minimis (e pilis luteis formatis) basin versus notatus. *Elytra* rufo-picea, posticè nigricantia, prope apicem abruptè depressa; singula lineis quatuor (quarum quarta parùm distincta) vix elevatis compressis, interstitiis crenato-striatis, totidem in dentibus ad apicem productis, suturalibus utrinque maximis; apice ipso pilis fulvis obsito. *Corpus* infrà piceum, pectore pallidiore. *Pedes* piceo-fulvi, geniculis nigrescentibus; femoribus crassis; tibiis perbrevibus, transversè sulcatis, ad marginem denticulatis, et in spinam fortem ad apicem productis. Tarsi ut in *Platypo cylindro*, articulo tertio haud bilobato, penultimo (4to) minutissimo (fig. 6. d.).

With the exception of the species of the genus *Paussus*, there is no coleopterous insect with which I am acquainted possessing such remarkable antennæ as the present. In many respects indeed they closely resemble the antennæ of *Platypus cylindrus*, &c., but with this very obvious difference, that the long basal joint, after giving rise to other joints of the same peculiar construction as those of *Platypus*, forms a sort of knee, and becomes considerably prolonged in a curvilinear direction, extending itself before the front of the head, being gradually dilated towards the apex, somewhat hollowed beneath, and strongly ciliated (fig. 6. a.).

The purposes for which this singular appendage may have been adapted must be curious matter of conjecture. The prolongation in question, forming by far the most conspicuous portion of the antennæ, at first sight presented all the appearance of a distinct joint taking its rise from the knee near the insertion of the other joints, beyond which part it is considerably contracted and more slender than the basal portion; but after the closest examination no trace of articulation has been discernible.

In its general character this insect is undoubtedly allied closely to *Platypus*: the elytra, however, instead of being furnished at the apex with a single obtuse point, are distinctly 4-toothed; but this, if not indeed existing to an almost imperceptible degree in the smaller species of *Platypus*, may be simply the effect of greater development, the carinæ of the elytra being prolonged beyond the apex and thus forming the teeth. In the *Platypus flavicornis* of Fabricius figured by Dalman in his memoir upon the insect found in gum animé, the extremity of the elytra is armed in a still different manner.

The structure of the lower parts of the mouth however differs materially from that of *Platypus cylindrus*. In that species the maxillæ have but a single lobe; but in my insect there are evidently two (fig. 6. b.); the outer one slender and pencillated at the extremity, the inner one obtuse and armed with flattened bristles. The maxillary palpi are 4-jointed (which appears to be the case also in *Platypus cylindrus*), the basal joint being very large, and the others, especially the penultimate joint, being much smaller. In both insects the two large basal points are furnished with a singular whirl of long stiffened hairs or bristles set on at right angles, or I should rather say inclining downwards; and the internal base of the maxillæ is furnished with numerous very long and curved hairs.

Again, in *Platypus cylindrus* that part which Mr. Curtis, in his beautiful work 'British Entomology', describes as the mentum, is somewhat short and urn-shaped, while in my insect it is much more elongate, and rather in the shape of a champaign glass, widest in front, with the sides nearly straight (fig. 6. c.). In *Platypus cylindrus* Mr. Curtis considers this organ "to be attached to the surface" (meaning of course the *inner* surface) "of the covering of the under side of the head." Upon an examination of my insect, however, (for the dissections of which, and of the other insects now described I am indebted to the kindness of Mr. Westwood,) it appears questionable whether the analogous part to which this organ is united by a membranous ligament from within, may not be the true mentum rather than an integral portion of the head, in which case the organ itself would form the labium; but the point may be open to controversy, and a careful examination of a species of *Platypus* while in a recent state, with due regard to the trophi of other allied genera, would appear to form the safest guide to a correct conclusion in the matter.

The labial palpi in *Platypus cylindrus* are of equal thickness to the base; but in *Pl. insignis* the basal joints are much the thickest, and the terminal joints shorter in proportion.

From all these various circumstances, and more especially from the very marked peculiarity in the antennæ, this insect appears to deserve the rank of a distinct subgenus; and at the suggestion of Mr. Westwood, I would propose for it the name of *Tesserocerus*, as not inapposite with reference to the curious formation of the antennæ.

XXXIII. *On the Earwig. By* J. O. Westwood, *F.L.S., &c.*

[Read October 6, 1834.]

It has been considered by some authors that those species of insects which subsist upon plants which are not natives of this country ought not to be regarded as indigenous although occurring in the greatest plenty. This opinion needs however to be received with much restriction, since if adopted in its full extent it would necessarily lead to the supposition that so strict a connexion exists between the plant and the insect that the latter is not found to attack any other plant.

But any person at all acquainted with floriculture knows well that many imported plants afford the most congenial food to our strictly native insects; for instance, the flowers of the dahlia * are gnawed, almost as soon as they have burst the calyx, in a very unsightly manner, but it is to the snails that the greatest portion of the damage must be laid. The earwig however has not an inconsiderable share in the mischief, feeding upon the corollas by night, and hiding itself between them by day. In fact these insects are great enemies of the florist and fruiterer, feeding upon ripe and decayed fruits, and other vegetable substances. It does not indeed appear to be naturally carnivorous, though if kept without proper nourishment it will, like many other animals, occasionally attack and devour even its own species. Sometimes also it appears in vast numbers, indeed it is noted in the Historical Chronicle of the Gentleman's Magazine, on the 19th Aug. 1755, under the head of "Stroud," that at that time there were such quantities of earwigs in that vicinity that they destroyed not only the flowers and fruits, but the cabbages were they ever so large. The houses, especially the old wooden buildings were swarming with them. The cracks and crevices were surprisingly full, they dropped out in such multitudes that the floors were covered; the linen, of which they are very fond, was likewise full, as was also the furniture, and it was with caution that people eat their provisions, for the cupboards and safes were plentifully stocked with the disagreeable intruders.

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* In like manner I have observed that the hollyhock is attacked by *Apion radiolum*, which undergoes its transformations in the stem, although its ordinary habitat is *Malva sylvestris*.

These circumstances, together with the not very gainly appearance of the insect, and united with the supposition that it creeps into the ears of sleeping persons, have rendered the earwig one of the most despised and abhorred amongst insects; although from the impossibility of any mischief arising (beyond fright) in case it should happen to attempt to enter the ear, as well as from the interesting circumstances which have been observed by different authors relative to the maternal sollicitude of the females towards their eggs and young, this comparatively harmless insect is not less worthy of attention than many of its more showy brethren.

But it is in the organization of the earwig that we find the most striking peculiarities. Thus we may in the first place notice the very beautiful structure of the wings, which although exhibiting a most elegant disposition of nervures when expanded, are capable of being folded up into a very small space so as to be nearly concealed by the minute tegmina.

But the whole structure of the insect is so peculiar that entomologists are not yet decided as to the order to which it belongs. The early authors considered it coleopterous, more recent ones orthopterous, and others, including some of the most celebrated entomologists—De Geer, Kirby, MacLeay, Leach, and Dufour—consider it as the type of a distinct order. Into the question of the situation of these insects I forbear to enter in this place, since my chief object in calling attention to this group is to detail some remarkable peculiarities of structure hitherto unnoticed by the distinguished authors who have treated at length upon this subject *.

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* With the exception of Messrs. Gené (*Saggio da una Monografia di Forficule*)

In a short note published in the 19th Number of the Zoological Journal, when speaking of the instability of the decapod annulose theory proposed in the 'Horæ Entomologicæ', the thorax being typically supposed to be composed of five and the abdomen of seven segments, the wings being regarded as two pairs of modified legs, I observed that the earwig was sufficient to disprove its correctness, the abdomen of that insect being in fact composed of nine distinct segments, the last of which is furnished, in addition to the caudal pincers, with an exserted anal apparatus; the thirteen segments of which the body of an annulose animal is typically composed being here fully and nearly equally developed in the perfect state, a circumstance of very rare occurrence, as some or one of the abdominal segments, although fully developed in the larva, are generally lost in the perfect state.

And in a second short communication in the 20th Number of the same work I have stated that being anxious to ascertain the situation of the spiracles along the body of an insect in which all the thirteen segments were thus fully developed in the perfect state, (in the hopes of discovering a clue to the solution of the remarkable question raised by French entomologists relative to the structure of the hymenopterous thorax, the hinder part of which is regarded by them as composed of the basal abdominal segment,) I had discovered upon examining some more specimens, that although the abdomen of the male was 9-jointed that of the female possessed only 7 segments; adding that this circumstance was very worthy of investigation as a clue to the solution of the question respecting the loss of the abdominal segments in those insects which have fewer than 9 joints in that part of the body.

The occurrence therefore of the insects in considerable numbers in the flowers of the dahlia and nasturtium (for they are very fond of creeping during the daytime into the attenuated spur of the latter flower as far as they can penetrate, leaving the abdomen sticking up in the midst of the pistil and stamens,) has afforded me an opportunity of making the requisite investigations for attaining an accurate acquaintance with the various particulars.

The abdomen of the female, as already stated, apparently consists but of seven segments, of nearly equal size, above; but when seen from beneath there appear to be only six unless the insect throws up its tail; the 6th ventral plate being much produced and conceal-

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and Brullé (*Hist. Nat. des Insectes*, vol. ix. p. 21.), who have noticed the difference in the number of abdominal segments, without ascertaining that this difference was apparent and not real, as subsequently shown.

ing a pair of lateral triangular plates, which have the angles brought into contact at the extremity of the body when at rest, but which when opened form the anal passage: besides this the pair of large terminal forceps and a small corneous central appendage are to be noticed.

On distending the abdomen of the female however, with a view to the discovery of the two lost segments which exist in the male, no trace can be observed of them from beneath, but from above there are to be perceived at the base of the last, or as it appears the 7th, abdominal segment two slight transverse impressions, which, on being observed laterally, are found to terminate in two ventral membranes. These therefore, it cannot be questioned, are the traces of the two segments (the 7th and 8th), which in the males are as fully developed as any of the others; but the situation of the spiracles or breathing pores most fully confirm the opinion.

M. Leon Dufour, in his 'Recherches Anatomiques sur les Labidoures ou Perce-oreilles,' published in the *Annales des Sciences Naturelles* for April 1828, has observed in his chapter upon the respiratory apparatus that the spiracles of the *Labidoura* (which term he proposed for the order of the earwigs) are extremely difficult to be observed, on account of their extreme minuteness, and because they are entirely hidden, either behind the scapular plates of the prothorax or the imbricated portion of the abdominal segments; in fact, in the ordinary state of the insect no one of them is to be observed. M. Dufour however only notices the prothoracic and the abdominal spiracles. Those of the mesothorax and metathorax which I have discovered he has overlooked, and the number of the abdominal spiracles he has not given.

The prothoracic spiracles are placed, as M. Dufour has described, beneath the epimera of the prothorax, in fact between the base of the first pair of legs and the posterior angles of the dorsum of the prothorax, being hidden from view by the free posterior margin of the epimera.

The mesothoracic spiracles are placed in a similar situation between the base of the legs and the posterior part of the place of insertion of the tegmina, hidden as in the former pair by the epimera mesothoracica; but the metathoracic pair of spiracles are very differently situated, being in fact dorsal, and placed near the posterior angles of the mesothorax, but concealed from view by the produced internal angle of the lower wings.

Not content however with discovering externally the four minute oval organs, which although having the appearance of spiracles might not be such in reality, I dissected the several portions of the thorax, and found that what I had regarded as mesothoracic and metathoracic spiracles were really such, giving rise to numerous tracheæ.

Thus each of the three thoracic segments is proved to be furnished with a pair of spiracles; and thus the argument of Latreille and Audouin, that the terminal part of the hymenopterous thorax must in reality be the basal segment of the abdomen because it is furnished with a spiracle, " caractère qui ne permet pas de confondre le segment avec le métathorax propre, puisque celui-ci en est dépourvu," is found to be unstable, at least if we may be permitted to judge from the analogy offered in this instance.

By considerably distending the abdomen of a female earwig the spiracles are brought into view. They are, as M. L. Dufour observes, " d'une petitesse microscopique," and it is only by holding the insect in certain positions that they can be observed at all even with a lens of high power. They are placed at the frontal angles of the recurved sides of the ventral plates, the angle itself being slightly excised. The first 6 segments are thus furnished, and a 7th pair is observed at the extremity of the first of the two rudimental joints, that is the seventh abdominal segment. There is none however on the side of the second rudimental joint (the 8th abdominal segment), nor can any be seen upon the terminal or 9th segment. For the purpose however of ascertaining beyond a question whether this 7th spiracle served for the supply of air to the 8th and 9th segments, I examined the internal structure of the extremity of the body, and by that means clearly perceived that this 7th pair of spiracles gave rise to a large trachea running towards the head, and another slightly ramified one which extended not only over the 8th and 9th segments but also ran into the caudal forceps.

Now from the rudimental structure of the 7th and 8th abdominal segments in the female it is not surprising that the 7th spiracle should extend to the extremity of the body, because as the 7th, 8th, and 9th segments are soldered together they are to be regarded as a single joint, and consequently as furnished only with a single pair of spiracles: but in the male the case is different; the 7th, 8th, and 9th segments are here equally developed, and each has its separate movements. I was therefore anxious to ascertain whether the 8th and 9th segments of the abdomen of the male were furnished with spiracles as well as the 7th, because if such were the case we might be led to expect the rudiments of such additional spiracles ought to be found in the female. On the most careful examination, however, I could find no external trace in the male of spiracles after the 7th abdominal segment, and upon dissecting this sex I ascertained that the 7th spiracle gave rise to a much more developed and ramified trachea than in the female, and which extended as in that sex to the caudal forceps.

Thus in this insect there are ten consecutive segments, including the three thoracic ones, each of which bears a pair of spiracles.

The structure of the thorax in this insect is also worthy of observation. The insect is a very good walker and its legs are of equal size, it is essential therefore that the sternum of each of the three thoracic segments should be nearly equally developed, and such is the case. The insect is also a flyer, but its posterior wings only are capable of assisting in aerial action, its minute tegmina being apparently incapable of rendering it any assistance. The tergum of the mesothorax is therefore very short, whilst that of the metathorax is large and nearly square; it is divided into two parts in a curious manner, the interior angles of the lower wings being produced internally in a narrow band until they meet in the middle of the back, and are extended backwards in a point. I know no other instance in which this character is to be observed. In the *Diptera* indeed the inner basal angle of the wings is internally produced behind at the sides, forming the alulæ; but in that order it is the anterior wings which are thus dilated, whilst in the earwig it is the posterior wings, a material point, and one which tends to show that where one organ in one group assumes the offices of another organ in a distinct group, the peculiarities of the former may be observed in the latter.

DESCRIPTION OF THE FIGURES.

Fig. 1. The three thoracic and two abdominal segments seen laterally, the limbs removed.

Fig. 2. The meso- and meta-thorax seen from above, the dorsal metathoracic spiracle (*a*) on one side being observed by the removal of the extremity of the anal lobe of the wing (*b*).

Fig. 3. The mesothorax alone seen laterally.

Fig. 4. The metathorax alone seen laterally.

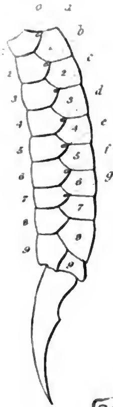
Fig. 5. The mesothoracic spiracle, with the base of the several tracheæ to which it internally gives rise.

Fig. 6. The abdomen of the male seen laterally, the segments numbered 1 to 9, and the spiracles lettered *a* to *g*.

Fig. 7. The three terminal segments of the abdomen of the male opened laterally, showing the development of the trachea arising from the seventh spiracle, the central tracheæ being truncated.

Fig. 8. Representing the part of this trachea which was removed, and which extended to the caudal forceps.

Fig. 9. The abdomen of the female seen laterally and distended: *a*, the anus; *b*, one of the anal triangular plates.



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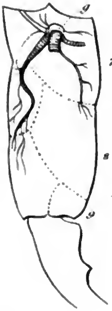

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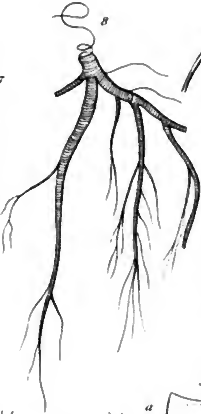

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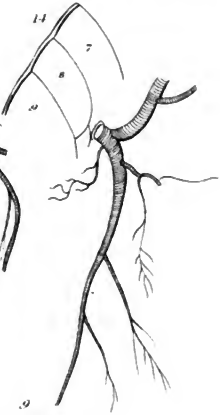

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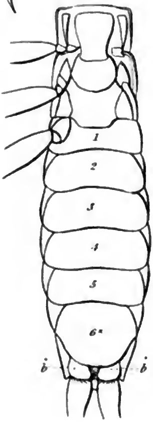

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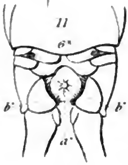

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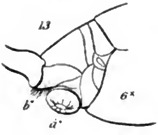

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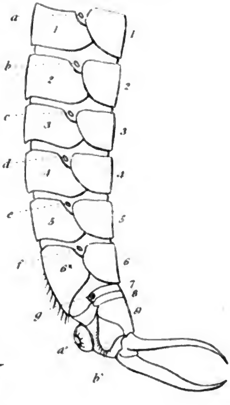

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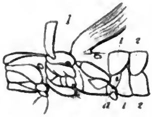

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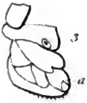

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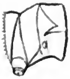

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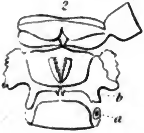

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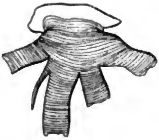

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Fig. 10. The thorax and abdomen of the female seen from beneath, in the natural position.
Fig. 11. The extremity of the abdomen of the female seen from beneath distended.
Fig. 12. One of the seventh pair of spiracles.
Fig. 13. The extremity of the abdomen of the female seen laterally distended.
Fig. 14. The dorsal portion of the three terminal abdominal segments of the female, showing the relative length of the tracheæ arising from the seventh abdominal spiracle.

XXXIV. *Observations on the Economy of the* Strepsiptera, *with the Description of* Stylops Spencii, *a new British Species recently discovered. By* W. B. Pickering, *Esq., M.E.S.*

[Read 5th January, 1835.]

Of the value and necessity of recording observations which fall under our notice, even should they merely relate to the most common insects, there can, I apprehend, be but one opinion, since so many interesting particulars remain unknown in the economy of almost every species, serving either as rewards for those who are willing to search for them, or as the means of confirmation of what is already known. If this be admitted in respect to well-known species, of how much more importance is it that publicity should be given to facts concerning those of remarkable structure and singular economy, concerning which, although they may have excited the attention of entomologists of all countries, we still remain, as regards many of their more important features, in a state of uncertainty and doubt, and where mere conjecture has endeavoured to supply many points relative to their economy! Of such insects perhaps the most remarkable are the species composing the order *Strepsiptera*, and I deem myself extremely fortunate in having made some recent observations on the genus *Stylops* which are likely to enable us (with the help of future inquiry) to elucidate its history. Previous however to detailing these facts, I will cite the opinions of the different authors who have written on this order as far as regards its natural history.

Rossi was the first entomologist to describe one of these remarkable insects; he was of opinion that the egg of the *Xenos* was deposited in the larva of the wasp previous to the closing of its cell; his words are: " Cui vespæ larva antequam cellulæ clauderentur forte incunabula dedisse videtur." Our much-esteemed Honorary

President was the first English entomologist who described an indigenous species of this order in his 'Monographia Apum Angliæ:' no allusion is made to its economy, beyond the fact of his having extracted the larva and imago from the body of *Andrena nigro-ænea*, and a suggestion whether the larva whose head is exserted may not feed by absorption. The same learned author, in the British Miscellany, states that Mr. Sowerby had suggested to him that what he took for larvæ (vide 'Mon. Apum Angliæ,') were really pupæ; adding, "To this ingenious conjecture I readily accede, as it removes all the difficulty with respect to their mode of feeding, the larva being entirely within the body till it is ready to assume the pupa state, then exserting its head at the dorsal inosculations of the abdominal segments so that the perfect insect may the more readily disengage itself when its time for disclosure is come." The pupæ are generally in pairs; these, it is suggested, may probably be the sexes. He wishes he could point out where collectors might meet with these insects, and thinks that by ascertaining in what state of the *Melitta* the *Stylops* deposits her egg, entomologists might be enabled to capture these desirable insects. In a paper published in the Linnæan Transactions by the same author on the propriety of forming these insects into an order, he gives some extracts from a letter which he had received from Mr. Peck of America, which as they relate to the economy of *Xenos Peckii* I must here notice. "The abdomens of the *Vespæ* were so distorted that he could distinguish them when on the wing; he caught some specimens of the wasps, fed them with sugar, and by this means obtained specimens of *Xenos*: he found by dissection that the head of the larva was in the feeding state turned towards the base of the abdomen of the wasp. When the feeding state is over, he conceives that the larva turns, and with its flattened head separates the membrane that connects the abdominal segments, and protrudes a little out. The head of the larva when first exserted is of a pale brownish colour, but by degrees assumes a rounder form and becomes almost black. Mr. Peck also notices the particular termination of the last segment of the abdomen of the imago, inquiring if it is a kind of aculeus for depositing its egg in the larva vespa, for it is in the larva that the eggs are probably deposited." To this Mr. Kirby adds as a note: "Reasoning from analogy it seems not probable, though I formerly inclined to this opinion, that the eggs should be laid in the wasp in its first state, and the larva feed on it to the last."

M. Jurine in his observations on *Xenos*, remarked that male as well as female wasps were attacked; discovered the larva entirely within the abdomen of the wasp when not visible externally, and that the head of the larva was turned towards the apex of the abdomen;

could not discover any mandicatory organs in the larva: and reared as many as twenty specimens, all of which had similarly formed abdomens and antennæ.

Messrs. Kirby and Spence, in their 'Introduction to Entomology', state that this order consists of two genera, *Xenos* and *Stylops*; since the publication of which Mr. Curtis has published two others, *Halictophagus* and *Elenchus*. Messrs. K. and S. further add that the eggs of the *Stylops* appear to be deposited in the abdomens of the *Melittæ*, on which the larvæ feed till, having attained their full growth, they perforate the membrane that connects its segments, and at the proper time their pupa-case bursts, they emerge, and take their flight.

From the preceding quotations we are enabled to perceive that the real extent of the knowledge obtained relative to the earlier stages of the life of the *Strepsiptera* only amounts to this, viz. that according to the statements of Messrs. Jurine and Peck the larvæ of these insects had been found entirely within the abdomens of the perfect wasp; but as regards the deposition of the egg, the suppositions of the different authors are much at variance, some saying that it is in the larva, others in the perfect insect, that the parasite lays its egg. Therefore the points in the economy of the *Strepsiptera* respecting which information or confirmation is required may be arranged as follows.

1. What are the sexual distinctions in these insects?

2. In what manner and at what period of the year does the fecundation of the female take place?

3. At what period of the year are the eggs deposited?

4. Are they deposited separately in the cell of the wasp or bee, or are they laid in the eggs of those insects, or within the larva, pupa, or perfect insect?

5. How long do they remain unhatched, and do they lie in that state until the larva of the insect attacked has attained its full growth, or assumed the pupa state?

6. How long do the larvæ of the *Strepsiptera* remain in that state? Do they cast their skins? In what manner do they feed?

7. How long do they remain in the pupa state?

8. Do the parasites render abortive the female *Hymenoptera*, in the bodies of which they are reared?

9. Do the sexes appear simultaneously?

10. Do the perfect *Strepsiptera* take any nutriment?

11. Of what use are those acute organs termed mandibles, and the two-jointed palpi?

12. What genera of bees are attacked in this country?

Having been informed by my friend Mr. G. Waterhouse that many of the *Andrenæ* were to be obtained during the winter months by digging, and as this mode of collecting presented several advantages, such as the discovery of the sexes of these bees, the ascertaining of the insects parasitic on the *Andrenæ*, and also that the specimens so obtained would be in the greatest state of perfection, I determined to adopt it, and I was fortunate in capturing *Andrena Clarkella*, *A. tibialis*, (both sexes of each,) and some species of *Halictus* and *Sphecodes* on Christmas-day; in the evening I killed these insects, and on examining a specimen of *A. tibialis* prior to setting it out, I observed some protuberances between the abdominal segments, and thinking my bee might be stylopized I endeavoured to remove one of these swellings, and the Society may imagine my surprise and joy on seeing a perfect *Stylops* issue forth.

That the *Andrena* from which the *Stylops* was taken had never quitted its cell is proved by the state of the specimen, which is very perfect, the discharge of a white fluid (this happened while the bee was in my hand), which takes place shortly after the birth of every insect; and from its being in its cell. It may be objected that the fact which I have noticed involves no new idea as to the economy of these insects, and that in finding a *Stylops* within the body of a perfect bee, I have done no more than many other collectors of insects; but in opposition to this I would state that the bees hitherto observed to be stylopized by every author have been found at large, and consequently that there is no proof as concerns them that the eggs of the *Stylops* have not been deposited in their bodies after their escape from the cells. The reverse of this however is the case with my discovery. Many of the *Andrenæ* are known to appear on the first bursting forth of the palm blossoms, a circumstance necessarily dependent on the weather; and as these trees afford an abundant supply of pollen, I consider it is in order to avail themselves of this supply that they undergo their last change so long previous to their appearance on the wing.

Admitting then the fact that our bee had never quitted its cell, and the *Stylops* ready to burst forth from an inclosed bee,—knowing moreover that the *Andrenæ* in their imperfect states inhabit earthen cells formed by their parents, which are closed when the egg and a sufficient supply of pollen paste are stored up, and that the *Stylops* from its delicate structure is unable to make its way through any depth of earth (for it was at about the distance of a foot that I found the cells of the *Andrenæ*),—we at once arrive at the conclusion that the *Stylops* must lay its egg previous to the closing of the bee's cell.

There is also another circumstance which has been overlooked by those authors who have considered that the *Stylops* deposits her eggs between the scales of the abdomen of the perfect bee. It is known that the *Stylops* appears at the same time of year as the *Andrenæ*, a fact which has evidently led to the adoption of such idea by those who have not calculated the impossibility of such a mode of proceeding; since, if such were really the case, one or other of two very different species of economy must be adopted, both of which militate against the general rules of insect life; for either the development of the *Stylops* must be so rapid as to take place during the short life of the *Andrena* in whose body the eggs have been deposited, or its development is slow and the bee remains alive till the following spring. But against these opinions it may be urged that we should be compelled, with respect to the former, to advocate that the *Stylops* being arrived at its perfect state in spring, must necessarily survive the winter in order to deposit its eggs at the commencement of the following spring in the newly disclosed bee, a circumstance which the tender construction of the *Stylops* completely prevents; whilst against the latter the well-known short life of the *Andrenæ*, and the fact now ascertained that bees are stylopized previous to leaving their cells, and which could not happen were we to adopt the latter idea, may, without fear of contradiction, be asserted.

Having proved that the *Stylops* cannot deposit her eggs in the perfect bee, and that it is impossible for it to make its way to the cell of the *Andrena* so as to lay its eggs in the larva of the bee, which are not born until after the cell is closed, I will now offer to the consideration of the Society the circumstances which appear to me to take place in regard to the deposition of the eggs of the *Stylops*, and which are founded on the necessary consequence that they must be laid in the cell previously to its being closed. Whether indeed it is in the cell itself that the eggs are deposited, so that the larvæ of the *Stylops* when born may make their way into the body of the larva or pupa, or even into the perfect bee, or whether they are actually deposited in the egg of the bee, we have no means at present of determining. I may however be allowed to mention that at the first I felt strongly inclined to adopt the supposition that the former of these opinions was the correct one, and that the larvæ when born made their way into the body of the larva of the bee; but not being able upon an examination of what is generally considered to be the larva of the *Stylops* to discover any organs by which it could effect this purpose I was obliged to give up this idea, and adopt the startling theory that the *Stylops* deposits her eggs in the egg of the *Andrena*.

With regard to the genera of bees attacked by this order of insects in this country, I am inclined to believe that the parasite is confined to that of *Andrena*, six species of which I know to be infested with it, viz. *Andrena nigro-ænea*, *A. tibialis*, *A. rufitarsis*, *A. labialis*, *A. fulvicrus*, *A. Collinsonana*?. I have no doubt that there are other species of this genus attacked which I have not been able to ascertain.

My *Stylops* is specifically distinguished by its comparatively large size; dark wings, marked with strong black nervures; basal joint of antennæ produced obliquely internally to a considerable distance beyond the insertion of the second joint; by the shape of the wings, which are produced at the external anterior angle to a point, and are very broad and rounded behind; and by the pitchy red anus.

As one of the species of the genus *Stylops* has been described with the name of our esteemed Honorary President, I have thought that this very distinct species could not be more worthily distinguished than by the name of his talented coadjutor, and have accordingly named it *Stylops Spencii*. (Plate XVII. fig. 1.)

Before concluding I must, as an act of justice to our Secretary, record my grateful thanks for his kindness and the valuable hints he has given me in the preparation of this communication.

P.S. Since the above observations were laid before the Society, I have had many opportunities of inspecting the cabinets of Mr. Kirby and other members of the Society; and I have therein found, as I had suspected, many other species of *Andrena* stylopized, in addition to those already enumerated, viz., *Andrena Mouffetella*, *A. varians*, *A. picicornis*, *A. parvula*, *A. xanthura*, *A. convexiuscula*, *A. Afzeliella*, a new species (No. 120); all which are in the collection of British Bees presented to the Society by Mr. Kirby; a new species of *Andrena*, near *A. labialis*, in the cabinet of Mr. Shuckard; *Andrena Gwynnana* in the collections of Mr. Westwood and myself, many specimens having been taken this year affected with these parasites; and two or three new species of *Andrena* in my own cabinet.

XXXV. *Observations upon the* Strepsiptera.

By J. O. Westwood, *F.L.S., &c.*

[Read January 5, 1835.]

The opportunity kindly afforded me by Mr. Pickering of examining a recently killed stylopized bee and its parasites has enabled me to add a few particulars, in addition to those given by that gentleman, and which relate, first, to the preparatory states of the *Stylops*, and second, to its structure in the imago state.

The bee was a female of *Andrena tibialis*, and had nourished three of these parasites: one of these Mr. Pickering had extracted in the perfect state, having scaled off the head-case; another, apparently in the state of a larva, he had extracted; and the third, together with the exuviæ of the last-mentioned individual, still remained within the abdomen of the bee, all having appeared between the dorsal articulations. For the purpose therefore of ascertaining the structure of the parasite still remaining within the bee's abdomen, and in the hope that it might possibly be in the pupa state, or perhaps ready to burst forth like the one first above mentioned, I carefully removed the scales from the under surface of the abdomen, when a quantity of thick white fluid first presented itself. On removing this the air-vessels and viscera were observed occupying the centre of the abdomen, on one side of which was an elongated fleshy white mass extended to the base of the abdomen, which proved to be the body of the remaining parasite, and which (from its vermiform appearance and the complete want of that solid appearance which the bodies of the dipterous larvæ assume when they have passed into the coarctate species of metamorphosis, and inclose the true pupa,) I should not hesitate to regard still as the larva of the *Stylops* although the head was protruded. On the other side the exuviæ of the first individual were observed.

Upon comparing the volume of the internal air-vessels and viscera when extracted with those of a perfect female bee discovered at the same time, it was at once evident that they were very considerably reduced in size, and although the ovaries were perfectly distinct in the latter insect, I was unable to perceive them in the former; indeed, as they are of considerable size, and are not conducive to the life of the bee, I should consider that Mr. Kirby's supposition that their presence renders the insects attacked abortive is well founded.

I next endeavoured to remove the remaining parasite, the body of which was internal, and its head exserted. The hind part of the body was perfectly free and yielded to the action of a pencil; but although I widened the space where the head protruded I found it impossible to detach the parasite, the neck being apparently in some manner attached to the interior surface of the bee's abdomen. After considerable difficulty I ascertained that the attachment was caused by a fine thread extending from one side of the neck and firmly attached to the abdomen of the bee. Mr. Pickering, who was present at the time, observed this curious circumstance as well as myself, and we preserved the parasite attached to a portion of the abdomen by means of this thread, in the bottle of spirits now exhibited, so that any person now present may himself perceive the connexion. Whether this thread was tubular or not I cannot state, but the circumstance, combined with the want of manducatory organs in the head of the *Stylops* larva as noticed by Jurine, seems to favour the idea originally entertained by Mr. Kirby, that the *Stylops* in its larva state feeds by absorption. I would however by no means wish it to be considered that this view of the subject is satisfactorily established, even although it appears to be confirmed by the examination of the exuviæ of the *Stylops* which Mr. Pickering had extracted. This, on removal, was found to consist of a thin and transparent pellicle, being of a long cylindric and narrow form, having the dorsal portion more darkly shaded, and presenting the appearance of indistinct articulations. This therefore appears to have been the larva skin of the insect; the neck exhibited the thickened appearance visible in the neck of the larva, and, precisely in the same situation that the thread above noticed was attached in the larva, I observed an apparent spiracle or circular aperture connected with an incrassated and apparently tubular process of the neck: within the pellicle I likewise observed a long thread which appeared to arise from the same aperture, but this might possibly be accidental as it was removed without any difficulty or rupture.

Within this pellicle at its posterior extremity was observed another crumpled-up mass of pellicle of a dark opake colour, perfectly distinct from the pellicle of the larva above mentioned, and which evidently had formed the covering of the inclosed pupa, and had been shed by it previous to the time when Mr. Pickering extracted the imago. Hence, as well as from the account given by Jurine, it is evident that the pupa of the *Stylops* is inclosed in a distinct skin, and is also in that state enveloped by the skin of the larva, contrary to the suggestion of Mr. Kirby; and hence the accounts and figures given by most authors of the pupa of these insects are in fact merely representations of the larva in an altered form, but totally different from that of the real pupa, which no one except Jurine appears ever to have seen.

No insects have so much perplexed entomologists with respect to their structural peculiarities as the present. Hence it is not perhaps surprising that we should find an author at one period regarding them as belonging to the *Hymenoptera* *, at another to the *Diptera* †, and at a third period as belonging to none of the established orders, but wandering comet-like amongst the entomological circles ‡. In the second of these instances Mr. Newman has published a series of observations upon the structure of the thorax and its appendages, and the oral organs, which, it is probable, if left uncorrected might lead to erroneous impressions as to the true structure and consequent affinities of the *Strepsiptera*. If indeed Mr. Newman had dissected the specimen of *Stylops* which he examined, or if he had carefully examined Mr. Curtis's beautiful figures of the dissections of this genus, or even those published from my figures, in Griffith's Animal Kingdom, he would surely have hesitated before he had made the observations alluded to. He would in fact thence have seen that the prothorax is clearly proved to be a very slender and short yet distinct segment, not lost in the mesothorax; that the mesothorax instead of being a large and conspicuous segment is scarcely larger than the prothorax, indeed Mr. Newman appears entirely to have overlooked it; that the part termed the scutellum of the mesothorax is the postscutellum of the metathorax; that the pseudelytra are attached to the collar-like mesothorax and not to the anterior part of the same segment which bears the miscalled scutellum; that these pseudelytra instead of representing the patagia or tippets are in fact the real analogues of the anterior wings of the *Lepidoptera*; that the large spreading wings of the *Stylops*, instead of representing the anterior wings, are the analogues of the posterior; that the supposed metathorax is only the produced lateral lobes of the metasternum; and that the pair of " crumpled opake whitish hind wings" stated to have been observed by Mr. Walker, and to be attached to this supposed metathorax, are either entirely extraneous bodies connected accidentally with the insect, or are torn portions of the real wings. I have not the slightest doubt with respect to this last assertion, having examined several specimens of *Stylops*, both in a living and dead state, without having been able to discover the least trace of such a pair of organs as those mentioned above, and which, had they existed, would surely not have escaped the notice of such observers as Jurine, Kirby, Latreille, Passerini, and Curtis.

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* Newman, in Mag. Nat. Hist., No. 23.

† See Entomol. Mag., vol. ii. p. 326.

‡ See *Sphinx vespiformis*, an Essay, &c.

With respect to Mr. Newman's identification of the structure of the mouth of these insects with that of the *Diptera*, this gentleman admits that he did not dissect it. I will therefore only observe that I cannot find the least analogy between the oral organization such as it is in *Stylops*, and the tubularly developed elbowed mouth of the *Diptera*, the labium of which is greatly elongated; whereas, on the contrary, there seems to me much greater resemblance in this respect between the *Strepsiptera* and *Lepidoptera*, the labium in both being soldered flatly to the head, the acute mandibles, as they have been termed in *Stylops*, representing the maxillary tongue of the butterfly, and the large palpi being much more analogous to the labial palpi of the *Lepidoptera* than to the maxillary palpi of the *Diptera*.

The rare opportunity of examining a living *Stylops* induced me to make a series of figures, from which those in the accompanying plate have been selected, and of which the following is the description.

PLATE XVII.

Fig. 1. *Stylops Spencii*, Pickering, magnified.
2. Ditto, with the wings closed.
3. Ditto, ditto, seen laterally.
4. Head of ditto, seen from beneath.
5. Ditto, ditto, seen in profile.
6. Metathorax and abdomen seen laterally, the wings and legs truncated.
7. Metathorax seen from beneath.
8. Tarsus.
9. Larva greatly magnified, seen from above.
10. Ditto, seen from beneath.
11. Ditto, seen laterally.
12. Anterior portion of ditto, showing the cord (*a*) by which it is attached to the abdomen of the bee (*b*).
13. Exuviæ of larva remaining in the body of the bee. (*a*.) Exuviæ of pupa remaining within the exuviæ of the larva.
14. A cord observed near the neck of the exuviæ of the larva.

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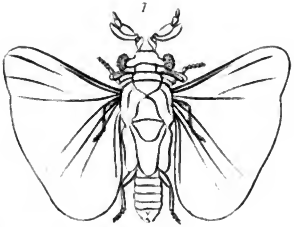

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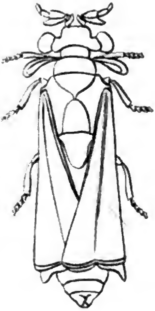

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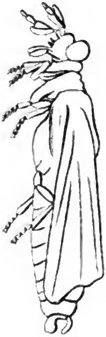

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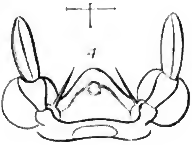

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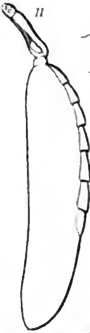

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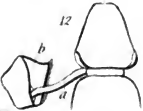

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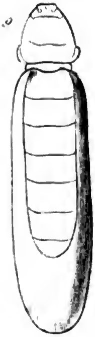

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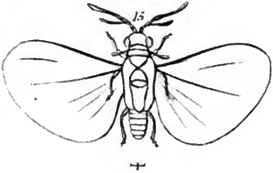

G.S. sc.

XXXVI. *Description of a new Strepsipterous Insect recently discovered in the Island of Mauritius.* By J. O. Westwood, *F.L.S., &c.*

[Read May 4, 1835.]

Genus Elenchus, *Curt.*

Species El. Templetonii, *Westw.* Plate XVII. fig. 15.

Fuscus, thorace valde gibboso, oculis magnis nigris, segmentis abdominalibus constrictis, antennarum articulo 5to subclavato et in medio subangustato, articulum referente; elytris clavatis nigricantibus versus apicem; alis latissimis pallidis fuscescentibus, nervis obscurioribus; tarsis ut in *El. Walkeri*, Curt. formatis; pedibus antennisque pube tenuissimâ indutis.

Long. corp. ½ lin.; expans. alarum fere lin. 1.

Habitat in Insulâ Mauritii.

This is by far the most minute species of this anomalous order of insects hitherto discovered; *Elenchus tenuicornis* (*Walkeri?*) far exceeding it in size, and differing from it in the darker colour of the body as well as in the tint of the wings, which is much less sooty than in that species.

Several specimens of it were captured by Robert Templeton, Esq., one of our most indefatigable entomologists, during the course of last August (1834) in the Island of Mauritius. I have accordingly dedicated it with his name as a slight return for the many kindnesses which I have received at his hands.

The existence of an insect like the present in a region where, from its peculiar geographical situation, very different kinds of insects might naturally be expected to be discovered from those found in our own country, is certainly singular, and at the same time highly interesting, and this is rendered the more peculiar by the limited number of Diplopterous and Melliferous insects existing in the Island.

At a former meeting of this Society * I took occasion to read an extract from a letter from Mr. Templeton relative to the capture of a specimen of the *Elenchus tenuicornis* in the nest of a Bombus in Ireland. Since his return from the Mauritius he has been so kind as to furnish me with the following particulars relative to the capture of this new species, and in which it will be seen that he seems now inclined to doubt the parasitic connexion between the *Elenchus* and *Bombus*, and which he had formerly supposed to exist.

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* Vide Journal of Proceedings, p. xxxix.

"Around my pavilion at Black-river, in the Mauritius, are stationed some large Tamarind and Bois de Napp trees, (*another* of the Leguminosæ, but I do not know what genus or species;) and the long grass about their roots, quite shaded from the extreme heat of the sun, concealed the little insects in question. I never could find them elsewhere, though I carefully examined under the trees on the hill and the thick jungle on the opposite side of the river. I began latterly to think that it was most probably their *locale*, from the wasps (*Polistes*?) being alone found in any numbers about the house; the yellow one building busily, last November, its papyritious habitation and the other (black, with a long abdominal peduncle) its clay mansion wherever it was permitted to remain unmolested. At any rate my supposition stated in a note in Curtis's 'British Entomology', fol. 433, becomes completely untenable, that it is parasitic on the *Bombus*, as there are none in the island. I found a good number of the *Elenchus*, but my net mutilated them so much that those you have are the only ones which escaped tolerably. I examined a vast number of the yellow wasps, but could never find any of the rings with appearances of any irregularity about them; perhaps it was the wrong season."

XXXVII. *Remarks on the Destruction of* Cocci.

By A. Ingpen, *Esq., A.L.S., &c.*

[Read April 6, 1835.]

I beg to exhibit a cutting of a golden pippin apple-tree, put into my hand by my worthy friend Mr. Anderson, Curator of the Physic Garden at Chelsea, which is much infested with the *Coccus arborum linearis*, Geoff.? The tree from which it was taken is trained against a west-aspected wall, and every branch is similarly covered. The injuries which the *Cocci* do to vegetation are very great, not only in green- and hot-houses, but also, which is of more importance, to the out-door fruits. The apple, pear, plum, peach, apricot, &c., suffer alike from their destructive attacks. The effects of their ravages on fruit-trees appear to be that, by absorbing the sap the growth of the trees is retarded, the fruit loses both size and flavour, and the crop decreases.

In consequence of the female *Coccus* adhering close to the bark it is extremely difficult to eradicate, and I am not aware of any method of getting rid of it in this state short of scraping it off the branches. This mode however would be extremely tedious and at the same time endanger the life of the tree. There are various remedies in use, such as washing the trees with tobacco water, soft soap and water, and lime water, all destructive of insect life; but in a matter of this nature economy is of importance. Vegetable solutions are not injurious to vegetable life, but mineral washes are no doubt dangerous. Lime water however is an exception, and combines three important qualities. It is perfectly harmless to vegetation, it is cheap, and at the same time destructive to insects. I should recommend two or three applications in the spring, at intervals of one or two weeks, of strong lime water with a brush, and a dusting of quicklime before the branches get dry; or a washing of soft soap and water, using also the powdered lime. For plants in the green- and hot-house a solution of bitter aloes is said not only to destroy the insect, but to prevent its future appearance on the plant washed with it.

I think the causes of failure in getting rid of this pest have arisen from the application of remedies at improper seasons, that is, when the female has become fixed to the plants. I would suggest that the remedies be applied when the young larvæ make their appearance. In this state they are locomotive and may be easily detected with a pocket magnifier. If therefore at this period any of the above remedies were applied two or three times in the manner before suggested, I have little doubt of a successful result.

XXXVIII. *Observations on* Haliplus ferrugineus *of Authors, being an attempt at its Subdivision into several Species. By* Charles C. Babington, *M.A., F.L.S., &c.*

[Read May 4, 1835.]

My attention having been drawn to the different appearance presented by insects placed in our cabinets under the name of *Haliplus ferrugineus*, I determined upon subjecting them to a careful examination, and have been repaid by the discovery of five marked forms included under that name. The total ignorance which at present exists on the subject of the limits of species in entomology, prevents me from giving any positive opinion upon the value of the characters described in this communication, and I now submit them to the Entomological Society under the idea that it is better to distinguish marked forms by a specific name than to run the risk of allowing good species to continue in obscurity by noticing them only as varieties. I may add that the character given under all the synonyms which I have been enabled to quote will apply to either of the five species if colour is excepted.

From an examination of the Linnæan cabinet it appears that the insect described by Linnæus in his later works under the name of *Dytiscus ferrugineus*, and placed in his collection with that name appended, in his own hand-writing, is not the *Haliplus ferrugineus* of authors, but the same as *D. ovalis*, Linn. (*Hyphidrus ovatus*, Auct.) described in his 'Faun. Suecica'. It would therefore appear that he has introduced the same insect under both of these names in his 'Systema Naturæ', ed. 1767. The fact that Fabricius, who had free access to the Linnæan collections, has no such insect as *D. ferrugineus* in either of his works, would appear to prove that he was certain of its nonexistence as a distinct species. Gyllenhal is the first author who has described anything under the Linnæan name, and I cannot suppose that he has had better, if such good, opportunities of determining the question as we have in England. I have therefore in the following description expunged the reference to Linnæus, and considered Gyllenhal as the first describer of *H. ferrugineus*.

St. John's College, Cambridge,
April 8, 1835.

HALIPLUS, *Latr.*

1. H. FERRUGINEUS, *Gyll.* Plate XV. fig. 2.

Rufo-testaceus, nitidus, elytris profunde punctato-striatis interstitiis seriebus punctorum minorum, thorace antice angusto, lateribus rectis, elytrorum, quorum maxima latitudo pone basin locatur, lateribus rotundatis. (Long. corp. 1¾, lat. ¾ lin.)

H. ferrugineus, Gyll. Ins. Suec. i. 546. Steph. Ill. (Mand.) ii. 40. non *Dytiscus ferrugineus*, Linn.

Reddish testaceous; head broad, minutely punctured; eyes slightly prominent, black; antennæ pale, equal in length to the thorax, which is much narrowed in front, emarginate, the anterior angles acute, the sides straight, slightly margined, scarcely in continuity with the elytra, posterior angles acute, distinctly punctured throughout, more thickly towards the margins, and a transverse curved series of larger punctures behind; elytra strongly dilated at the base, very near to which is their broadest part, from thence gradually narrowed to near the apex, when the curvature of their sides is greatly increased, each marked with ten rows of large deep punctures, each of the interstices having a remote series of minute punctures and a continuous line of the same near to the suture, the larger punctures dark; under side pale, the ventral laminæ rather faintly punctured; legs paler.

In Mus. Soc. Entom.

Taken at Cambridge.

2. H. SUBNUBILUS, *Bab.* Plate XV. fig. 3.

Ferrugineus, nitidus, elytris profunde punctato-striatis, interstitiis seriebus punctorum minorum, thorace antice angusto, lateribus rectis, elytrorum, quorum maxima latitudo pone basin locatur, partibus intermediis laterum subparallelis. (L. c. lin. 1¼.)

Dull red; head and thorax as in *H. ferrugineus*; elytra strongly dilated at their base, very near to which is their broadest part, but they decrease very slightly in width until past their middle; punctured as in *H. ferrugineus*, the larger punctures and numerous blotches dark, forming two interrupted oblique fasciæ upon each elytron, meeting at the suture; under side paler, the ventral laminæ more thickly and deeply punctured than in *H. ferrugineus*.

Taken near Cambridge, but not in company with the preceding.

3. H. FULVUS, *Fab.* Plate XV. fig. 4.

Rufo-flavus, nitidus, elytris profunde punctato-striatis, interstitiis seriebus punctorum minorum, thorace antice angusto, lateribus rectis, elytrorum, quorum maxima latitudo ad ¼ longitudinis locatur, lateribus rotundatis. (L. c. 2, lat. 1—1¼ lin.)

H. ferrugineus, var. b., Gyll. Ins. Suec. i. 546. Steph. Ill. M. ii. 40.—*Dytis. fulvus*, Fab. Syst. Eleu. i. 271.

Reddish yellow: head broad, minutely punctate; eyes very slightly prominent, black; antennæ pale, about equal in length to the thorax, which is much narrowed in front, emarginate, the anterior angles very acute, sides straight, slightly margined, not in continuity with the elytra, posterior angles acute, the disc smooth, the margins thickly punctate, and a transverse curved somewhat irregular series of large punctures behind; elytra strongly dilated at the base continuing slightly to increase in width for about ¼ of their length, from that point narrowing in a curve of continually increasing curvature to the apex, punctate as in *H. ferrugineus*, all the larger punctures and a few oblong spots between the striæ dusky; under side darker, the ventral laminæ deeply punctured; legs paler.

In Mus. Soc. Entom.

Taken at Cambridge.

4. H. PARALLELUS, *Bab.* Plate XV. fig. 5.

Fusco-flavus, nitidus, elytris profunde punctato-striatis, interstitiis seriebus punctorum minorum, thorace elytrorumque lateribus subparallelis parte anticâ hujus et apicali illorum exceptis. (L. c. 2, lat. 1—1¼ lin.)

Dusky yellow; head short, very broad, thickly and rather deeply punctate; eyes prominent, black; antennæ pale; thorax but little narrower in front than behind, slightly emarginate, sides nearly straight except near the anterior angles, where they are rounded, slightly margined, not in continuity with the elytra, the posterior angles but little less than right angles, thickly punctured, with a small space on the disc smooth, and a transverse slightly irregular straight series of large punctures behind; elytra strongly dilated at the base, the sides then continued nearly parallel but in most cases narrowing slightly for about three fourths of their length, afterwards quickly attenuated to the apex, punctate as in *H. ferrugineus*, the larger punctures and frequently the suture dusky, that colour often suffused so as to give the appearance of a transverse fascia at the base, and a cloud on each elytron towards the apex; under side rather paler, the ventral laminæ deeply punctate; legs paler.

In Mus. Soc. Entom.

Taken at Cambridge.

5. H. RUBICUNDUS, *Spence MSS.? Bab.* Plate XV. fig. 6.

Ferrugineus, nitidus, ovalis, elytris profunde punctato-striatis, interstitiis seriebus punctorum minorum, thoracis elytrorumque lateribus in eâdem arcu. (L. c. 1¼, lat. ¾ lin.)

H. ferrugineus, γ. Steph. l. c. supra.

Dull red; head short, broad, minutely punctured, the vertex smooth; eyes scarcely at all prominent, black; antennæ red; thorax much narrowed in front, with its lateral margins very slightly rounded, and so nearly in continuity with the elytra, which are but little dilated at their base, as to give the insect's outline the appearance of forming a uniform curve, the whole approaching very closely to the ovate form, the disc smooth, the margins thickly punctate, the transverse series behind not so distinctly marked as in the three preceding species; elytra but little dilated at the base, gradually increasing in width for about one third of their length, then decreasing gradually to the apex, punctate as in *H. ferrugineus*, the suture, larger punctures, and numerous irregular clouds, particularly towards the apex, darker; under side red, the base of the abdomen darker, ventral laminæ coarsely punctate; legs dull red.

Taken at Cambridge.

I have little doubt that all the above species may be found in numerous, if not all, parts of the country; but not having myself authentic specimens from other places, I have only ventured to name Cambridge as their locality.

XXXIX. *Notice relative to* Aëpus fulvescens, *and other submarine Coleopterous Insects. By* W. Spence, *Esq., F.R.S., Hon. Mem. E.S., &c.*

[Read 1st June, 1835.]

M. Audouin in a paper read to the Academy of Sciences, and which he has lately had the goodness to send me, has given some interesting details as to the habits of *Aëpus fulvescens*, a very small beetle of the family of *Harpalidæ*, which passes a great portion of its life under the sea; but he does not seem to have been aware that the same singular mode of existence obtains also in the case of other Coleopterous insects, and had been in part noticed by an English entomologist as long since as the year 1810. As this fact, which I stumbled on by chance within these few weeks, may be unknown to some of the members of the Entomological Society, as it previously was to me, I beg to point it out to their attention by this hasty and brief notice, and the rather as a good deal of further investigation seems to me yet to be required, and which they are very competent to undertake, in order to throw a full light upon the singular facts to which M. Audouin has directed our attention. The English entomologist to whom I allude is the late Rev. John Burrell, who in a paper in the first volume of the Transactions of the former Entomological Society, entitled "Remarks on *Staphylinus tricornis,*" read April 2nd, 1811, informs us that on the 27th April, 1810, walking on the sand-hills near the sea at Cley, in Norfolk, he observed on the level spaces between the hills, just as the tide began to ebb and they became sufficiently firm to walk over, numbers of the males of *St.* (*Bledius*) *tricornis*, which were in search of their females which inhabited holes in the sand, in which he found two of them, and of which holes, he observes, "whenever I lost the trace they terminated in very moisture; consequently these insects may be truly accounted aquatic, or rather subaquatic, i. e., inhabitants of the soil beneath the water." (p. 314.) It is to the same indefatigable entomologist and keen observer Mr. Burrell, that is due the credit of having first observed that another Coleopterous insect, the *Pogonus Burrellii*, (which name it is to be hoped no foreign entomologist will attempt to alter, or hesitate to adopt,) has precisely similar habits: and respecting this species and its congeners he communicated to Mr. Curtis, who has inserted them in the 1st vol. of his valuable work, Plate 47, some important remarks, in which he distinctly states that "the genus *Raptor* (*Pogonus*), confined as it is to three British species (*Burrellii*, Haw., *chalceus*, Marsh., and *æruginosus*, Steph. MS.), is perfectly maritime, the species being all found in the same situation, and may be deemed subaquatic, for in the winter, and a considerable part of the summer, the habitat of these pretty animals is entirely covered with water, which stagnates many inches deep in the low places of the marshes after the tide has flowed and ebbed."

It is quite evident from the preceding quotations that at least as early as 1810 it had been observed by Mr. Burrell that two Coleopterous insects, viz., *Bl. tricornis* and *Pog. Burrellii*, were truly subaquatic, living a considerable part of their existence under the sea-water; but he does not appear to have been struck by the fact as particularly remarkable, and still less was he led to those important speculations as to the mode in which these insects are enabled to respire in such a situation, for which we are indebted to M. Audouin, who, in the case of *Aëpus fulvescens*, attributes it to the faculty of alternately decomposing and renewing the small bubble of air with which it is provided, as are probably both the insects in question.

It appears then that at least three Coleopterous insects of different genera are strictly submarine, and pass a large portion of their lives under the sea-water, or at least two of them, for Mr. Burrell says that the habitat of *P. Burrellii* is covered with water all the winter, and a considerable part of the summer, and M. Audouin that the habitat of *A. fulvescens* is so low down on the beach that it can only be uncovered at spring-tides for a few days twice a month, so that it seems highly probable, as he seems to suppose, that these insects, while thus covered with sea-water, have the means of procuring themselves food. This however is one of the points which it would be very desirable to ascertain, and which those entomologists who reside in the neighbourhood of the submarine insects in question might probably solve by transferring some of the insects along with stones, sea-weed, and sea-water into capacious vessels, and then carefully watching their operations.

Another point worthy of inquiry is whether several other insects usually found on the sea-coast, and in particular some of the species of *Hesperophilus*, Hope, may not be submarine like the three noticed, and as Mr. Babington tells me he has reason to think is the case with the larvæ of some Dipterous insect.

And lastly, it would be well deserving of further investigation how far all these insects are constantly surrounded with an air-bubble, and whether there is ground for believing that it is alternately decomposed and renewed, as M. Audouin, agreeably to the theory of M. Dutrochet, supposes.

In laying before the Entomological Society the above hasty and imperfect remarks, one of my main objects is to give an example of those brief *notices* of any casual fact, observation, or suggestion occurring to any member in the course of his reading or studies, which though not sufficient either as to bulk or importance for a regular *paper*, may yet serve as the subject of interesting discussion at the close of each meeting, and which whether printed in the " Proceedings" of the Society, either in the form in which it is communicated or condensed into a few lines as may seem best to the Council, to whose discretion they should be wholly left, could not fail to convey information to many of the members, and to lead others to more extended inquiries relative to the points adverted to.

W. SPENCE.

May 20, 1835.

XL. *Some Account of the Land-crabs of the Dukhun; by Lieut.-Col.* W. H. SYKES, *F.R.S., &c. With a Description of the Species, by* J. O. WESTWOOD, *F.L.S., &c.*

[Read June 1, 1835.]

THESE creatures, called *Kenkra* by the Mahrattas, abound along the Ghàts from 17° to 19° 23′ N. latitude, the limits of my observation; but I have little doubt their location is extended very much further north and south in an oblique line running between the 73°

and 75° meridian. Their burrows are found in all the valleys, and on the most elevated table-lands at from 2000 to 5000 feet above the level of the sea, but I do not think they extend inland from the Ghàts (that is to say, to the eastward) above fifteen or twenty miles. They are also found along the base of the Ghàts in the country called the Korkun. In the abundant rains of the south-west monsoon, in the localities they affect, which appear to be determined by an aluminous soil, they are seen in a state of great activity, running over the surface, and frequenting the public roads in such numbers that instances are constantly occurring of their being crushed under the feet of horses and cattle, those of foot-passengers, or the wheels of vehicles. Their movements are active and lively, and they must have a quick perception of danger from the precipitation with which they retreat from it. During the months of extreme dryness, December, January, and February, they are rarely seen out of their holes, and I presume must either be in a dormant state or must derive nourishment from the soil in which they have imbedded themselves. As the moisture increases along the line of the Ghàts in March, April, and May,—and it increases in the ratios of the proximity of the location to the western edges of the Ghàts,—they reappear upon the surfaces, and in April and May, when the fogs produce a copious aqueous deposition, they are rather abundant. Indeed I found them not only numerous but troublesome; for being encamped in the hill-fort of Hurreechundurghur during those months and the month of March, the numerous servants who slept upon the ground were constantly disturbed by crabs invading their beds, and in my own tents they were frequently found under the bed, the tables and chairs; indeed all the specimens I have preserved, large and small, were intruders in this way. As they are met with of all sizes in their habitat, I have every reason to believe the productive processes to be completed without having recourse to migration to the sea-shore as is related of some other species of land-crab. Indeed had such been their habit it must have come under my notice, or that of some of the many intelligent observers of nature in Western India. The natives at least would have been aware of it; but such is not the case. My attention was first called to them on the 30th July, 1812, in a journey from Poona to Baroda. In a leisure moment I had an opportunity of watching from behind a rock in the Ghàts a crab collecting its food: the celerity and ease with which the two fore claws were used made them efficient substitutes for hands, and its rapid lateral movements at pleasure to either side, as objects attracted its attention, were very efficacious in enabling it to capture its prey, which appeared to me to be insects and animal matters of various kinds. From this period I had been alive to all notices of the land-crab, and have no doubt had its habits been migratory I should have heard of them.

It may be as well to give the following extracts from my Journals to show my impressions at the moment regarding its localities and habits *.

"CAMP AWPHA, (on the edge of the Ghàts,) *Jan.* 19, 1826.—Multitudes of the holes or burrows of the land-crab are seen about Awpha, at the level of 2888 feet above the sea. The creatures do not appear to come to the surface during the cold and dryness of this season of the year, but lie dormant at the bottom of their holes, which are pierced in a stiff whitish clay.

"CAMP HURREECHUNDURGHUR, *March* 31, 1829.—The table-land of this elevated hill-fortress, at 3900 feet above the sea, is inhabited by such multitudes of land-crabs, that their burrows render it unsafe to ride over many parts of the mountain."

THELPHUSA CUNICULARIS, *Westw.* Plate XIX. fig. 1—6.

Thelph. Testa piceo-nigra, latiore quam longiore clypeo marginato, antice, supra antennas intermedias, rectè truncato, maxillipedum externorum articulo 3tio subhexagono, pedibus ferrugineis fasciis numerosissimis nigris transverse notatis, testa in medio bipunctata.

Long. testæ unc. 1 lin. 4., lat. 1. 10½.

This species nearly approaches *Thelphusa indica*, Latr., Enc. Méth. x. 563., Guerin, Icon. R. An. Crust. pl. iii. fig. 3. The shell or carapax is considerably broader than long, and is much narrowed behind; it is uniformly of a dark chestnut black colour, and is nearly smooth. Its front part is considerably depressed. On each side, behind the eye, is a short tooth, and behind this the margin is slightly crenulated for about one third of the length of the margin, being in this part brought into a sharp edge. The sides are marked by numerous slight oblique gutters, which are very irregular and broken: a rather deep longitudinal impression extends longitudinally down the middle of the shell, for about one third of its length. Two oblique impressions extend from each lateral angle of the front of the thorax, meeting together in the middle of the shell beyond the centre; within these impressions, on each side, are two small circular punctures. The first pair of legs are of unequal size, the left-hand claw being the larger; each is more strongly crenulated than the sides of the shell, the lower edge of the claw itself being notched; the upper angle of the wrist is produced into a point, accompanied by several smaller teeth. The tarsi are toothed both internally and externally. The front of the shell is deflexed so as almost to hide the base of the antennæ, the exterior pair of which is very small, and composed of only eleven joints, including the three large basal articulations; this pair of antennæ is inserted at the inner angle of the oral cavity. A straight and slightly elevated line runs from the base of the outer antennæ; this is succeeded by a very short transverse piece, with an entire posterior margin, having an obtuse tooth in the centre, which fits into the space left open by the curvature of the terminal joints of the external foot-jaws, which joints are very small; the third joint of these organs being somewhat hexagonal and much smaller than the 2nd joint, which is oblong. The claws are of the colour of the shell, but the basal joint of the first and the whole of the other legs are much paler-coloured, being of a dirty testaceous brown, with very numerous small transverse black marks.

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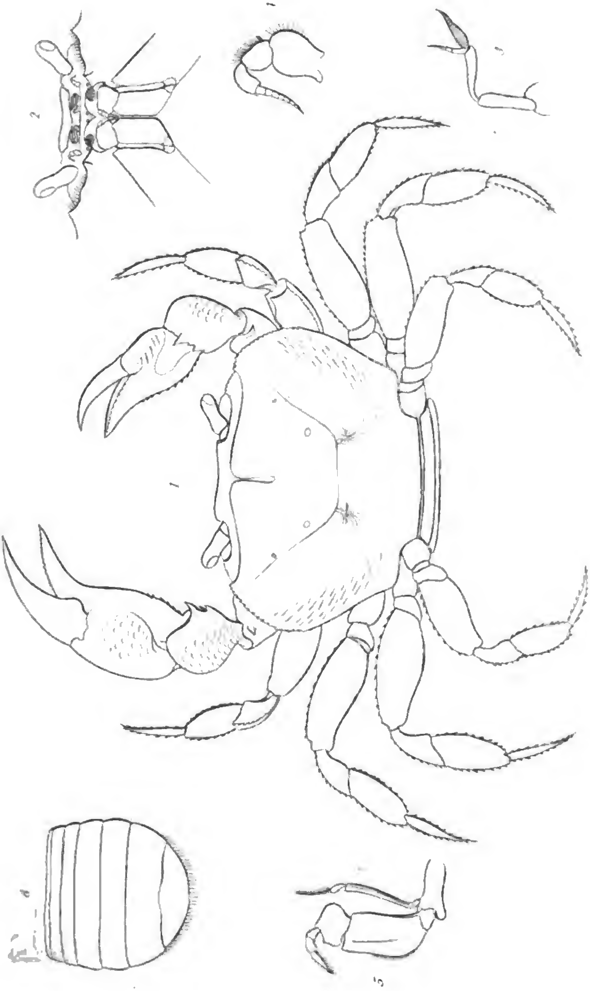
* "All the grass through the Deccan generally swarms with a small land-crab, which burrows in the ground, and runs with considerable swiftness, even when encumbered with a bundle of food almost as big as itself; this food is grass or the green stalks of rice, and it is amusing to see the crabs sitting, as it were, upright to cut their hay with their sharp pincers, then waddling off with their sheaf to their holes as quickly as their sidelong pace will carry them."—Extract from Bishop Heber's Journal, communicated by W. Sells, Esq.

The genus *Thelphusa* comprises several species of crabs whose habits differ considerably from those of the majority of the brachyurous *Crustacea*. The type, *Telph. fluviatilis*, resides, as the specific name implies, in the rivers and fresh waters of the South of Europe, and an interesting account is given of its economy in the 10th vol. of the 'Encyclopédie Méthodique.' It is eaten in summer by the Pope and Cardinals, and other high church dignitaries. It is also found in the rivulets of Mount Athos. M. Leschenault de Latour discovered another species, the *T. indica* of Latreille, on the coast of Coromandel, where it is called by the inabitants of Malabar "Tille Naudon." It frequents situations where the "Manglier" grows; but in the 'Cours d'Entomologie' this species is also stated to have been found in the mountains of Ceylon, although it is not affirmed to reside out of water.

PLATE XIX.

Fig. 1. *Thelphusa cunicularis*, mag. nat.
2. Front of the body seen from beneath.
3. Interior antenna.
4. Exterior antenna.
5. Outer foot-jaw.
6. Abdomen of female.



J. O. W. del.

G. P. S.

XLI. *Descriptions of some undescribed exotic* Crustacea.

By ROBERT TEMPLETON, *Esq., R.A., &c.*

[Read 1st June, 1835.]

THE following pages contain notices of a few of the minuter *Crustacea* which were picked up either at Mauritius or on the way thither; they are interesting from their either presenting new forms, or adding species to those genera of which European species alone have been yet detected. A considerable number yet remain unexamined, which I hope will prove sufficiently interesting to form the subject of another memoir.

Artillery Barracks, Woolwich,
May, 1835.

ANISOPUS DUBIUS. Pl. XX. fig. 1.

Greenish, dotted over with reddish brown specks. Head large, subquadrangular, carrying 4 antennæ, the superior nearly as long as the body, and exceeding in length by about one fifth part the inferior; the 1st joint is minute, the 2nd large and thick, the 3rd elongate, nearly cylindric, and wanting the little process which characterizes the true *Gammari*, 4th joint multiarticulate, tapering. The inferior antenna has the 2nd and 3rd joints, subequal, much longer than any of those of the superior, and the remaining similar, but of smaller dimensions. Both antennæ are spiny or hairy. The thoracic rings are narrow, and extend inferiorly into plates concealing the upper part of the 5 anterior pairs of legs. Those of the abdomen are much larger and end in a 4-articulated tail, with a jointed stylet on each side proceeding from the inferior posterior angle of the ultimate and penultimate articulations. The first pair of legs is extremely minute and terminates in a simple claw, the 2nd much longer, as are the 3 succeeding pairs, and terminates in joints slightly dilated, the last carrying a tolerably strong curved claw. The 3rd pair has the last joint very much dilated, subtriangular, not toothed, but bearing a very strong curved claw; the posterior edge is waved and hairy. The 2 succeeding pairs of legs resemble the 1st pair except in their greater size; but the 6th and 7th pairs, of nearly equal dimensions, exceed all the anterior legs in being both much longer and much more robust, and besides differ in having the coxæ very much dilated, and the last joint of each leg clavated, surmounted by two blunt teeth, and a large dentated curved claw directed forwards. Immediately behind these legs arises, from the inferior part of each joint, the bifurcate articulated appendages which are called fin-feet; so that all the rings of the body have either true or fin feet or styles articulated to them, in this respect differing from all hitherto noticed genera.

This species swims with considerable rapidity and has all the habits of our common European marine *Gammari*. Its size is about ⅛th of an inch, and its colour subject to but little variety, being of a greenish tint more or less brownish in the specimens I have examined. In its generic characters the great and disproportionate length of the 2 last pairs of feet, the fin-feet arising from the succeeding joints, and the appearance presented by the antennæ, which are much longer than in the contiguous genera, at once distinguish it. The claws also offer distinctions.

Fig. 1. *a*, The animal magnified.
b, The last joint and claw of the 6th pair of legs.
The feet of one side only are figured, to prevent misconception or confusion in the drawings.

THAUMALEA DEPILIS. Plate XX. fig. 2.

Erythrocephalus melanophthalmus? Tilesius, Neue Ann. Wetterausch. i. p. 6. pl. xxi. *a*. fig. 5.

Body hyaline, with a few dark specks, especially along the edges of the abdominal plates or rings. The head is quadrangular, not large; the eyes deeply imbedded in it; front retracted inferiorly, from about its middle arise the superior antennæ, which are short and tumid; 1st joints short, forming together a truncated cone on which rests the elongate spindle-shaped 4th joint. The inferior antennæ arise from the inferior part of the frontal surface; they are much smaller than the superior, composed of 4 joints, of which the 1st is small and obconic, the remainder in length subequal, the last conic. The body swells out to about the 5th ring, when it again becomes gradually reduced in size and ends in a bifurcate articulated tail. There are only 6 legs apparent, the 2 first pairs being very short and apparently without claws, the 4 posterior pairs of about equal length, tapering, and with slender slightly curved claws. From the abdominal joints proceed bifurcate articulated appendages, but, as well as the whole animal, apparently devoid of hairs.

This minute species swims but badly, having none of the celerity of motion so conspicuous among the *Gammari*, to which it bears resemblance in its form. It differs from every genus I am acquainted with, in the antennæ, in the relative dimensions of the legs, the elongate and undilated form of the tarsal joints, and in the claws. I confess my inability to allot to it its proper place among the minute *Crustacea*, the differences being in fact more conspicuous than qualities by which its affinities to any one genus can be traced. It was found off Port Natal, in the summer of 1835, in lat. 37° S. and 21° East, while I was searching for *Zoeæ* in the sea-water. It is about $\frac{1}{8}$th of an inch in length.

Fig. 2. *a*, The animal greatly magnified.
b, One of the inferior antennæ.

ANOPHERURA MINUTISSIMA. Plate XX. fig. 3.

Cyclops ecornis? Tilesius, Neue Ann. Wetterausch. i. p. 7. pl. xxi. *b*. fig. 15.

Dark greenish. The head very large, with two minute spines in front curving downwards over the base of the superior antennæ. Superior antennæ of about $\frac{1}{3}$rd of the length of the body, with two rather elongate joints about their middle; the rest short, and some of them spiny or hairy. Inferior antennæ with the apical joint resembling a straight claw, the preceding joint being contracted posteriorly at its middle and furnished with short thick hairs. Beneath the head project two pairs of legs, the 1st with the joints hairy and successively smaller until they reach the tarsus, which is dilated, ovate, and furnished with a claw directed forwards. The last pair of legs is much larger and longer; 1st joint short and thick; next elongate, a little contracted near its middle, and having projecting from its distal head immediately in front of the articulation a toothed spine which presents a most singular appearance; the 3rd joint is also elongate, not so thick, contracted beyond its middle, and spiny along the back; the 4th is about of equal length, and carries a set of curved spines and a claw. The 4 thoracic (?) annuli are successively smaller, and furnished with bifid appendages attached to lateral toothed plates, or processes from the rings; and the tail is composed of six joints, numerously articulated and bifid at its extremity, and stands straight up at right angles to the line of direction of the body when the animal is at rest. The body is never rolled up in a ball and is quite opake. It is about $\frac{1}{30}$th of an inch long. It was found among marine plants.

Fig. 3. *a*, The animal magnified.

PLEXOCERA MIRABILIS. Plate XX. fig. 4.

Body and large joint of the antenna black. Head white or hyaline. Eyes sessile. Antennæ large, elongate, composed of 5 joints; the first two subequal, and apparently subdivided or partially subdivided;

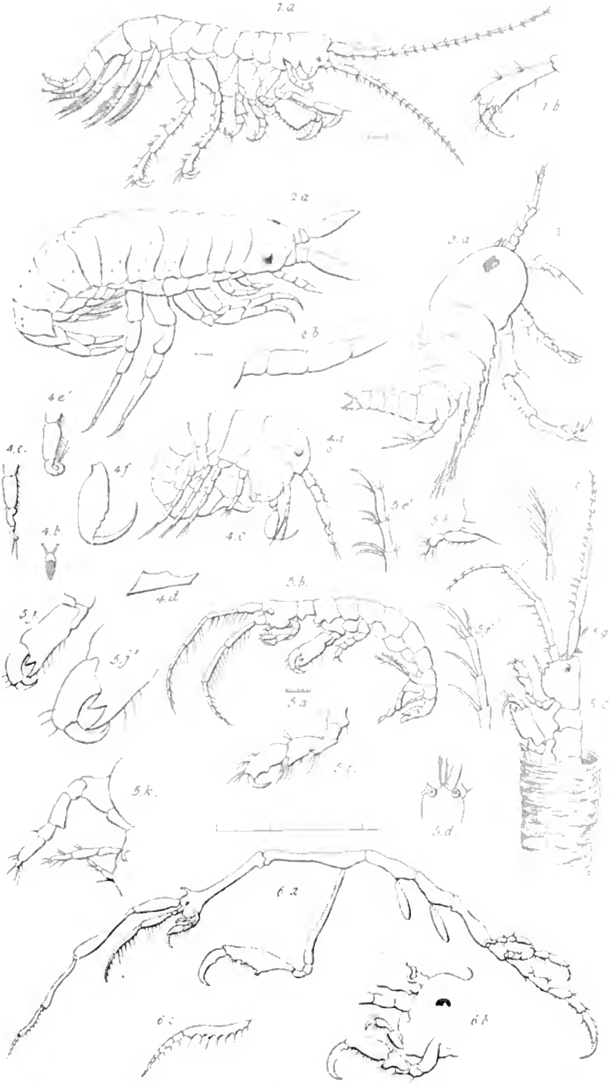
the 3rd nearly as long as both taken together, spindle-shaped, and supporting the extreme joints, which are reniform, closing upwards or forwards on each other as the finger does into the palm of the hand, the apical joint having two long hairs arising from its tip. The anterior leg (?) with two elongate joints projecting beyond the facial plates, the tip surmounted by two hairs. Second leg with a large dilated tarsus, and a strong claw directed forwards, closing on the tarsus during each sweep of the leg with a snapping motion, rapid and very peculiar. The third pair of legs resembles in every respect the first pair, excepting that it is more profusely furnished with hairs at the tip. From the three succeeding abdominal annuli proceed inferiorly 4-articulated appendages or fin-legs, elongate and hairy, especially at the tips; and between these and those of the opposite side curves forwards the tail, which terminates in a thin angulated hyaline process.

This singular little animal swims with great rapidity, the antennæ being widely separated, and their apical joints almost in perpetual motion, seizing apparently on objects so minute as to escape my notice. When at rest the tail and posterior legs were folded in, and the antennæ downwards, so that the animal resembled a ball, a peculiarity noted by Risso in his genus *Typhis*; there were here however no thoracic plates beneath which they could be concealed. The snapping spring-like motion, with which it moved the claw of the second pair of legs struck me as very peculiar, and as indicative of a degree of vivacity which is rather rare among the smaller *Crustacea*, as they usually seize upon objects with an appearance of deliberation and dread, the result most probably of dear-bought experience.

Fig. 4. *a*, Natural size.
b, The animal as it appears when swimming.
c, A very magnified view.
d, The tail.
e, *e'*, The last joints of the antennæ, exhibiting the apical stretched out and folded in upon the other.
f, The claw of the second pair of legs, with the tarsus on which it plays.

CERAPUS (*Say*) ABDITUS. Plate XX. fig. 5.

Brownish, antennæ and legs paler. Body elongate, composed of about 14 rings, including the head and tail, the latter having about 3 joints. The head is large, subtriangular, most dilated anteriorly, a minute rostrum projecting forwards between the superior antennæ. The eyes are nearly sessile and smooth. The front is almost vertical and gives origin to four nearly equal antennæ; the superior tapering, about $\frac{2}{3}$rds as long as the body, has three joints of nearly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equal lengths, and a fourth 5-articulate about as long as the two which precede it. Of the three the 1st is somewhat thicker, and perhaps shorter than the two succeeding. The inferior antenna has the 1st joint very short, thick, and somewhat conical, and the 2nd and 3rd much longer and thicker than the corresponding joints of the superior, the apical remaining part, or 4th joint, being but very slightly longer than either; it also is composed of five joints. Both sets of antennæ are hairy, the hairs arising from the inferior surface in a double row, and becoming longer as they approach the apex of each of the first three joints; in the remaining part they are short, in threes or fours, and more resembling spines than hairs. Between the antennæ stand obliquely upward two palpi, each composed of two elongate filiform joints, the extreme with a very long brush of hairs. Lower down we find three joints of another (maxillary ?) palpus, the extreme joint being very minute, nearly as long, but not so rotund as that upon which it rests, and not so hairy. The joint supporting the head is small, appearing like a neck, and gives origin to no legs. One pair however arises immediately in front of it from the after part of the head, whose basal joints are small, the two apical longer, more dilated and angulated, the angles giving rise to pencils of hairs. From the inferior part of the apex, which is transversely truncated, arises a short much-curved claw, not fitted into any perceptible fissure in the under part of the joint. The 2nd pair of legs arises from the 2nd ring from the head, and has the penultimate joint extremely large, subquadrangular, with a large tooth projecting from the inferior posterior angle, and another smaller from between it and the surface of articulation of the last joint. The last joint arches over the above-mentioned teeth, and has a strong hooked claw, arising from the inner side of the apex. The last pair of legs have the same number of joints as those described, but they are devoid of peculiarity, being subequal and tolerably cylindric.

From the 8th annulus arises on each side one of those bifid hairy appendages or fin-feet which are common to the *Gammari*. They differ in no essential point from the appearances presented by them in that tribe; but from the inferior posterior part of the same ring, and partially concealed by a lateral plate, is to be found on each side a distinct leg, closely resembling the third pair, but wanting the claw, a minute joint with a tuft of hairs replacing it. The two succeeding annuli each offer one of these last, but they become successively smaller and more filiform.

The entire animal is about ⅛th of an inch long, exclusive of the antennæ, and it presents some peculiarities, with one exception, unique in this family. It has formed for itself or seized upon a little membranous tube, nearly $\frac{1}{8}$th of an inch long, which does not resemble the case of *Tubularia*, but seems composed of a series of rings, and resembles in texture the papyritious covering of the pendulous wasps'-nests. It is perfectly cylindrical, of a brown colour, and opake. When disturbed the little animal retires within this tube, the tips of the antennæ alone appearing, with which it continues to investigate its neighbourhood; and whenever the feeling of perfect security prevails, it comes out as far as the second or third ring from the head, the antennæ being perpetually in motion, extended to the right or left, or as if lashing the objects about it. When it wishes to change its place it seizes with its claws the little fragments of sea-weed about it, and dragging, urges itself forward. I have never seen it dash itself through the water by any mode similar to that of the *Gammari*; and I should infer that the tube was its natural place of residence from the want of legs or fin-feet at the middle rings, in which it differs from *C. tubularis* of Say, that author figuring a regular succession of both. I have observed the tail slightly protruded, and the members which are sketched as attached to adjoining rings used as feelers. While watching it, which I did for some hours, I was exceedingly surprised and amused to find it disappearing from one end of the tube, and reappearing like magic at the other, having doubled itself up towards its belly in the passage, but with such quickness, considering the narrow calibre of its mansion, that I could hardly credit my eyes but that it had two heads, and indeed a gentleman who was in the pavilion with me at the time could not be persuaded to the contrary. The animal however scarcely remained a second at this extremity, but shot back to the one it had formerly occupied; and during the time I watched it I never saw it remain permanently at it, or rather I should say for a longer period than a second, or second and half at furthest. The maxillæ resemble those of *Scolopendra*, but are very minute, and I believe the smaller palpi arise from them or a very closely adjoining part, but vision is so indistinct in so small an object as to make me hesitate in affirming this. The circulation of the blood was distinctly visible in the antennæ, and the globules, unlike those I had hitherto examined, were rotund and of comparatively large dimensions. From the upper part of the head a spine, with a very dilated base, extends forwards to between the roots of the superior antennæ. The eyes were black, with a pale encircling ring. The head brown, dotted with white, especially behind; and the antennæ pale, annulated imperfectly with reddish brown.

Fig. 5. *a*, The tube, of its natural size.
b, The animal out of its tube.
c, The animal as it appears in its tube.
d, The head seen above, showing the palpi.
e, The superior antennæ.
e', The tip of the same antennæ.
f, The inferior antennæ.
f', The tip of the inferior antennæ on the same scale.
g, The palpus standing obliquely upwards.
h, The (maxillary?) palpus which is attached to the parts of the mouth.
i, The first pair of legs.
j, The two ultimate joints with the claw of the second pair of legs.
k, The supplemental legs arising from the joints immediately preceding the tail.

CAPRELLA (*Lam.*) SCAURA. Plate XX. fig. 6.

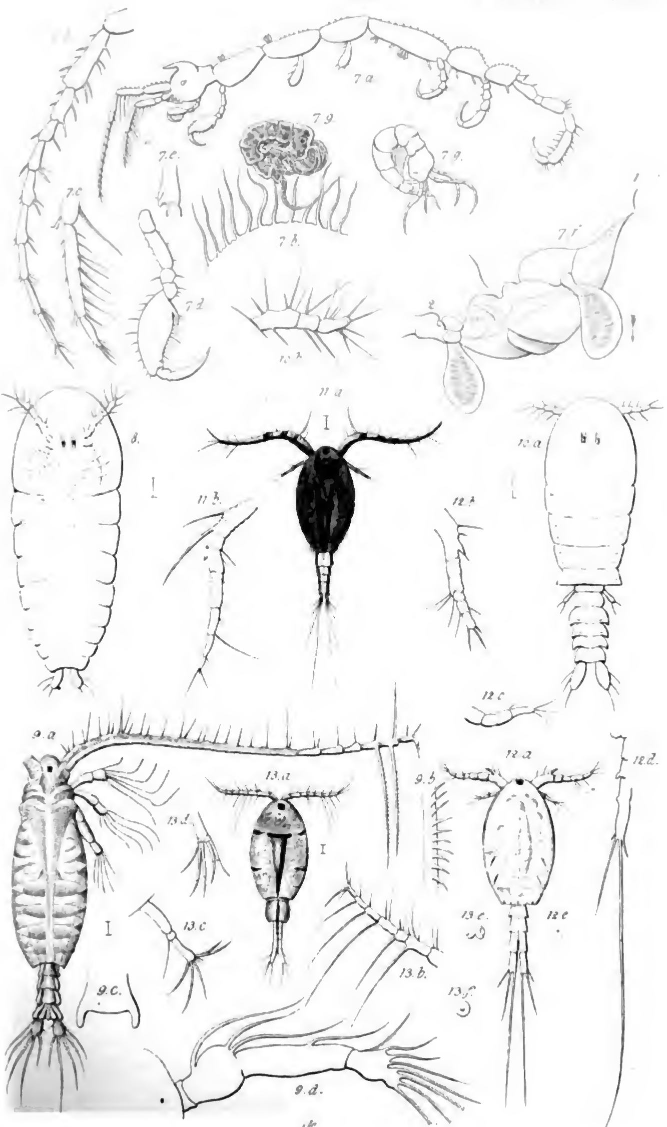
Pale brown. Body linear. Superior antennæ twice as long as the inferior: the 1st joint thick, contracting a little towards its apex; 2nd elongate, obpyriform; 3rd very slender and waved; 4th equally long, with minute spines arising from teeth or elevations on the inferior surface, beyond its middle subarticulated. Inferior antennæ with the first 2 joints minute; 3rd elongate, and similar in form to the 2nd of the upper antennæ; 4th of about the same length, waved, and, as well as the last, with a double series of hairs arising from the inferior edge, and increasing in length as they approach the apex of the joint; 5th not so long, tapering, spiny, and articulate. Eyes sessile, compound, in an irregular arch behind the root of the inferior antennæ. Head rotund, with an occipital spine, and a pair of feet, 5-jointed, attached behind: a triarticulate claw-bearing palpus projects in front. The joint of the body which supports the head is long, cylindrical in the middle, but swollen out at the extremities. The second joint of the body is much the longest, tumid posteriorly, and giving attachment at the thickest part to a very elongate slender pair of legs. The 1st joint very long and waved, 2nd and 3rd minute; 4th dilated, especially in the middle, hairy, with two toothlike processes inferiorly and a large dentate claw articulated to its apex. The two next joints of the body are shorter and rather thicker than the anterior, and have attached, a little beyond their middle, at a part which juts out, two vesicular appendages, which are narrow, ovate, and scarcely so long as the joint from which they originate. The three last joints give attachment posteriorly to three pairs of legs, successively longer, monodactyle and hairy; the 1st leg has five joints, the 2nd six, and the last four. Two small spines arise from near the base of the ultimate joint in each leg.

From the tip of the antennæ to the claw of the hind leg measures about one inch. The animal is very slow and deliberate in its motions. It was found among marine plants at Rivière Noir, Mauritius.

Fig. 6. *a*. The animal magnified.
b, The anterior part of the head, showing the anterior pair of legs and the palpus.
c, Extremity of superior antenna.

CAPRELLA (*Lam.*) NODOSA. Plate XXI. fig. 7.

Pale brown, with a darker longitudinal line marking the position of the intestinal canal. Head very short, the separation from the 1st joint being only distinguishable by a minute dark dorsal line; the eyes black and smooth, not apparently compound: superiorly the head is furnished with a small blunt spine curved forwards. Superior antennæ longest: 1st and 2nd joints robust, elongate, and almost ever porrect, the greatest amount of motion taking place at the articulation between the 2nd and 3rd joints; the 3rd is shorter, somewhat obconic, and supports the remaining joint, which is tapering, multiarticulate, the subdivisions being nearly of equal lengths, and furnished with a few short, often articulated, blunt spines towards their distal extremities. The three first joints have similar processes, but they are not confined to this latter position. The inferior antenna is in length about one third less; in other respects it bears a considerable degree of similarity to that just described. As far as I could observe, the animal has a double set of palpi, but projecting so little beyond the buccal plates as to be scarcely distinguishable; the hook and one joint of the inferior was alone porrected sufficiently to be sketched. The 1st joint of the body is short, performing the office of a neck, and has arising from the head immediately in front of it a small leg, precisely similar to that attached to the anterior part of the succeeding joint, and of which a more magnified sketch is given. The 2nd joint of the body is longer than the head and 1st joint taken together, but both are so extremely short as to distinguish this from all other authenticated species. In some specimens this joint and some of the others have two or three small processes in groups, moveable and occasionally articulated, projecting from the back. The 3rd and 4th joints of the body are rather elongate, and each has a flat pyriform vesicular appendage articulated to it, within whose edge is distinctly to be seen a large vessel carrying blood; the globules are oval, and easily to be distinguished passing across the appendages in wavy lines with irregular velocity, pausing sometimes as if stagnated, and again urged forwards until they mingle in the stream, returning along the posterior edge of the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T. del.

appendage. Leach and Desmarest consider these as rudimentary feet, while Latreille looks upon them as branchiæ. There seem no laminæ or offsets from them passing into the water, and in delicacy or transparency they are not in the least different from the legs or antennæ, so that I am inclined to concur in the correctness of the former of these opinions. In the females, between the pairs of appendages, and extending from the anterior inferior extremity of the third segment of the body to the posterior part of the fourth, is to be found a complicated apparatus, which Bosc calls "un ovaire très volumineux lorsque la fécondation est opérée." Its essential parts consist of three mobile plates; one placed anteriorly, and arising by an articulation from the anterior inferior part of the 3rd joint, is most external, and permits the posterior edge of the second plate to project a little from beneath it. The lateral edges of this plate are membranous, and continued into the exterior covering of the sides of the 3rd and 4th joints, or into little lateral plates occupying the same position, so that a free motion is allowed on the anterior extremity as a centre, towards the belly of the animal, and producing a sliding motion over the other two plates. The second plate is narrower, lies beneath the first, and covers the apical half of the third or postèrior plate. The third has similar attachments to that first described from the posterior part of the fourth joint, but has its lateral or superior edge, unlike it, irregularly waved, and extended as far forwards as the vesicular appendage to the 3rd joint. These plates are continually in motion, moving like a hinge on their basal extremities, and sliding over each other against the contiguous plate, as the free edges were made to approximate or recede from the belly of the animal. I succeeded in abstracting a number of young from the cavity, which is perhaps capable of holding a dozen or fifteen. They were not inclosed in a shell, being probably beyond the period required for their sojourn in the egg. They were however rolled up in a little oval ball, the legs and antennæ being all turned in. The fleshy opake part of their body was at a tolerable distance within the hyaline membrane forming the exterior covering of the body, especially in the legs and antennæ, where it appeared occupying the centre of the joints like a little heap of dark globules. The joints were proportionably shorter and thicker, but equally numerous as in the adult state. At this period respiration was going on, for I saw the plates forming the ovary in continual motion, the water gliding in and out as the plates were moved with the sliding motion over each other. The edges of the plates are fimbriated to prevent the escape of the minute ova, and at the same time to admit of free passage to the water; and the blood was distinctly seen penetrating through vessels; which traverse the plates principally in a longitudinal direction. Of the remaining segments of the body the fifth was by far the largest and had several clusters of the little processes noticed above; and to its distal extremity was attached a leg composed of five hairy joints, the last having a strong hooked claw. The next segment was smaller, but with a much larger leg, and the last smallest of all, and with by far the largest pair of legs, and a little subtriangular process placed between and above their attachment.

This species of *Caprella* is found in considerable numbers among the marine plants at Mauritius; it is about $\frac{1}{5}$th of an inch long, and moves with considerable velocity through the water. It is not voracious, never follows any of the smaller *Crustacea* to seize on them, but contentedly devours the very minute ones which chance throws in its way. The specimens vary a little in the appearance of the joints.

Fig. 7. *a*, Animal magnified.
b, Part of the second and remaining joints of the superior antennæ.
c, Last joint of the inferior antennæ.
d, Second leg.
e, Second joint of that leg seen obliquely.
f, Ovary. *f* 1, Anterior part of the third joint. *f* 2, Fourth joint. The arrow shows the direction of the current of blood.
g, The young; the joints equally numerous as in the adult, but proportionally shorter and thicker.
h, The fimbriated margin of one of the plates seen from below.

SAPPHIRINA (*Thompson*) FULGENS. Plate XXI. fig. 8.

(Syn. *Oniscus fulgens*, Tilesius, Neue Ann. Wetterausch. i. p. 10. pl. 213. fig. 24. *Sapphirina Indicator*, Thomps. Zool. Researches, pl. 8. fig. 2.)

Minute, hyaline, but usually returning a most beautiful ultramarine blue tint, or transmitting the supplementary colour; ovate. Head large; eyes two, central, brick-coloured, with a darker middle; antennæ two, spiny, triarticulate (?), small, the last joint alone projecting beyond the head. Body composed of eight segments, the most anterior as broad as the head, from thence gradually diminishing in extent as they approach the posterior extremity of the animal; last ring arched, furnished with a small hairy scale or appendix on each side; fin-legs numerous.

This little animal moves very slowly through the water, having to depend entirely on the fin-legs for its progress; but the brilliancy of its tints makes it an object of great attraction, and leads the observer to suppose its size much greater than it really is; at a depth of five or six feet it seems as large as a shilling, and still larger at night, when it becomes luminous. It was found in great numbers in calm weather off the southern peninsula of Africa.

Fig. 8. *a*, The animal magnified.

Calanus (*Leach*) Arietis. Plate XXI. fig. 9.

Pearly blue, purplish interiorly. Elongate-ovate, narrowed slightly anteriorly. Head small, quadrate, seemingly formed of a central part containing a deeply immersed rufous eye, and two lateral parts forming the roots of two extremely large antennæ. Antennæ curved, multiarticulate, spiny, the penultimate and preceding joint being furnished with two rather long spine-like processes directed backwards, and carrying numerous acute ciliæ, which, as in *Beroe* and *Cestus*, are perpetually in motion, throwing out iridescent tints. Behind the head the body is irregularly tumid, and gives origin beneath to three pairs of robust, somewhat clavate legs, carrying numerous long waved spines or hairs. The fin-legs could not be observed, from the minuteness of the animal rendering vision obscure; they seemed however pretty numerous. The last segment of the body was concave posteriorly, and supported the tail, which was about half the length of the body, and dilated posteriorly, the segments having on each side an obtuse process descending and covering the articulation with the next segment laterally. The last joint had on each side a quadrangular appendage, with long curved spines, and internally a valvular part was observed to expand and contract with extreme regularity, like the dorsal vessel of some insects.

This minute species, which unquestionably belongs to the genus *Calanus* of Leach, was detected in the middle of the Atlantic Ocean. The ciliæ at the extremities of the antennæ are extremely curious, and I believe not to be found in other species of the same genus; but I have not lately had an opportunity of examining *G. longicornis*, from which this differs in many other respects.

Fig. 9. *a*, *Calanus Arietis*, magnified.
b, Portion of one of the ciliated spines.
c, The form of the posterior edge of the caudal segments.
d, The anterior leg, in one specimen.

Cyclops? (*Muller*) laticauda. Plate XXI. fig. 10.

Hyaline; the eyes, which are separate, and minute dots along the dorsal plates rufous. Head very large. Antennæ very short and spiny, three irregular joints only, projecting beyond the head; first segment of the body as broad as the head, rest diminishing in width, last angulate posteriorly; first and second caudal segments smaller than the third, which is nearly semicircular in outline; three posterior similar in form, but of smaller size; the ultimate with two rather large spined appendages. The first segment with a curved process, terminated by two spines or hairs on each side, (Male generative organs ?)

In considerable numbers off the Cape, June, 1835. No variety in form or appearance.

Fig. 10 *a*, Animal magnified.
b, Right antenna.

CYCLOPS (*Mull.*) OBESICORNIS. Plate XXI. fig. 11.

Ovate, somewhat variable in colour, but usually dark green with reddish streaks. Eye red, single, deeply immersed; antennæ very large, geniculate, multiarticulate, the basal articulations not clearly defined, an irregular transverse line alone marking their position; spiny, one very remarkable in every specimen curving forwards from the angle: palpi (?) slender and very hairy. Tail tapering, bifurcate, and terminated by a number of spines, of which two are rather conspicuous from their length.

The antennæ of this species are usually dark reddish, in paler specimens they assume a pale pink, but differ in none in the slightest degree in form. They are found in considerable numbers in a little rivulet which crosses a part of M. Genève's property at Rivière Noir, Isle of France.

Fig. 11, *a*, *C. obesicornis* magnified.
b, The left antenna.

CYCLOPS (*Mull.*) LONGISPINA. Plate XXI. fig. 12.

Ovate, hyaline or slightly pinkish. Exceedingly minute. Eye pink, diffused, deeply immersed. Antennæ moderate in length, rather robust, armed with a tooth-like process arising from the second joint, and with a spine partially concealed by it. Tail not dilated, with a few long spines proceeding from the bifurcate apex, one extremely long, and repeatedly jointed from about its middle. The palpus robust, tapering, composed of three subequal basal joints, and a longer and more slender apical one furnished with three diverging hairs.

This beautiful little animal was exceedingly common in the water in which the last was detected; its size, the process of the antennæ, and the long spines of the tail sufficiently distinguish it from every hitherto described species.

Fig. 12, *a*, *C. longispina*, magnified.
b, Right antenna.
c, Right palpus.
d, Left division of the tail.

CYCLOPS (*Müller*) SIMILIS. Plate XXI. fig. 13.

C. captivus? *Mül.*

Blueish or brownish. Eyes and a dash on each side of the head and first annulus of the body red. Body ovate, a circular scale terminating it posteriorly, and from whence arises a diminutive tail, as in the other species, spiny. The eyes are double, each kidney-shaped, the facets looking outwards and a little forwards. Antennæ about half the length of the body, many-jointed, with hairs or spines, especially towards the tip, those passing backwards being the longest. The palpus was waved, the penultimate joint minute, the rest elongate, and the tip terminated by a set (5) of bi- or tri-articulated hairs, curved and moveable on the palpus, their appearance leaving me still in doubt whether they should not be accounted claws. I believe the animal used them as organs of prehension, from the mode in which they were moved about. The outer edge of the last joint of the legs is dentate, the teeth blunt.

This species approaches so nearly to the description and figure of *C. captivus* of Müller, that singular as would appear the extensive range of the animal through the ocean, I hesitate considerably in refusing to refer it to his synonymy. One of the females had a little cluster of eggs, each hyaline with a pink centre, beneath the tail; they were about forty in number. The animal was found among marine plants at Mauritius.

Fig. 13, *a*, Magnified figure.
b, Left antenna.
c, Right palpus.
d, Tip of the palpus.
e, The eyes.

CYPRIS (*Müll.*) ARISTATA. Plate XXII. fig. 14.

Green, elongate, dorsum arched, beneath slightly concave, posterior extremity protuberant, anteriorly furnished with minute spines. Antennæ 5-jointed, long bristles arising from the 3 terminal joints. Posterior pair of legs furnished with a long claw directed forwards, anterior pair with four claws, one being toothed and attached to a minute joint which terminates the leg.

In fresh water among *Charæ* and *Confervæ*, Mauritius.

Fig. 14, *a*, *C. aristata*, magnified.
b, View from above.
c, Enlarged view of the spines anteriorly.
d, Left antenna.
e, Last joint of hind leg, with the claw.
f, Fore leg.
g, Tip, showing the minute joint and the toothed claw.

CYPRIS (*Müll.*) MUCRONATA. Plate XXII. fig. 15.

Ovate, green, one variety æruginous, scaly posteriorly with a minute aculeus curving upwards. Anterior legs with three subequal claws; posterior with short not much curved claws. Motion very slow.

This minute species was found with the last.

Fig. 15, *a*, *C. mucronata*, magnified.
b, The aculeus.
c, One of the claws on the hinder legs.

XLII. *Notes upon the Habits of various British Insects.*

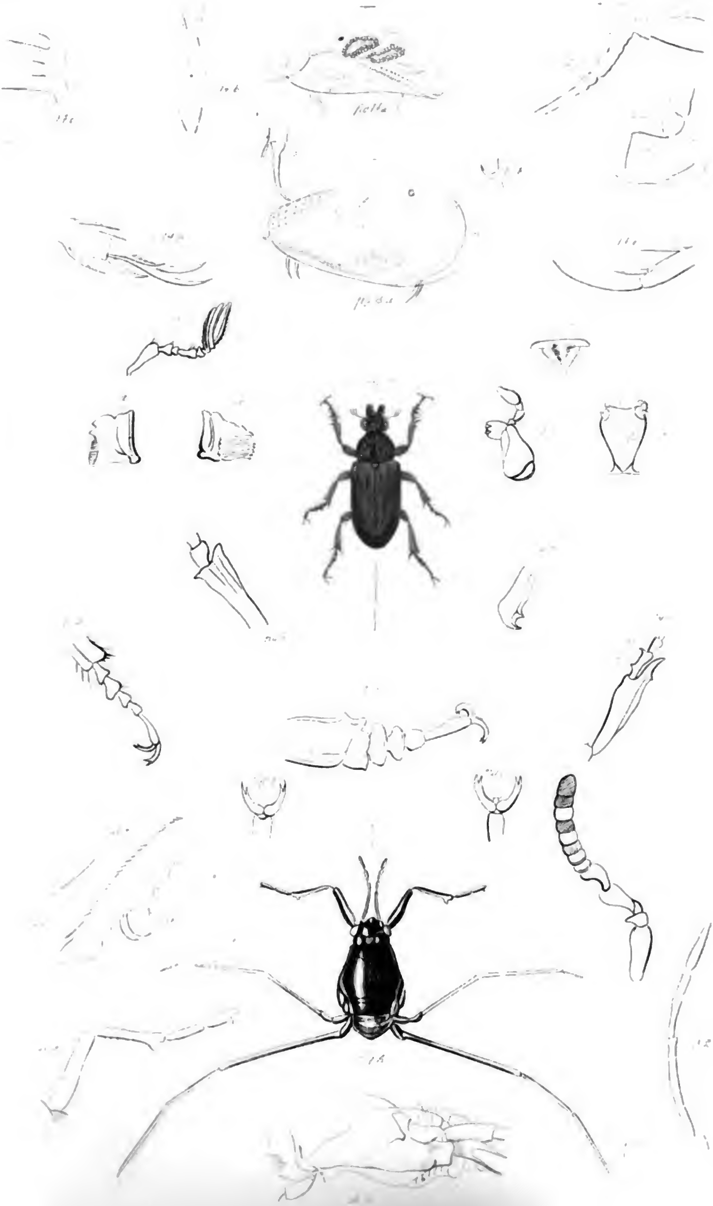
By J. O. WESTWOOD, *F.L.S., &c.*

[Read August 3, 1835.]

THE science which the entomologist cultivates may justly be deemed one of the most interesting of pursuits, constantly affording, as it does, fresh matter for gratification; for it fortunately happens that should he be unsuccessful during his rambles in the capture of objects of rarity, he has at command the means of endless observation upon the habits of those which do fall in his way, and which, from the comparatively little hitherto recorded, will delight him if new, and will not tire him, if even already noticed.

In some of my recent excursions, when tired with my walk and " heated in the chase," I have seated myself on some soft turfy spot near the residence of some of the sand-wasps, and have amused myself with watching their various employments.

Ammophila hirsuta first attracted my attention. The specimen was a female engaged in constructing her nest; she was very busily employed scratching in the sand with her fore legs, and soon formed a hole about a third of an inch deep. Whilst thus engaged I placed myself as near to her as possible; on withdrawing her head she discovered my proximity to her, when creeping upon a little stone close by, she reconnoitred and then flew away. I lost sight of her for some time, but on proceeding to the next sand-bank I found her flying about, and as she soon quitted this spot I fancied she might have returned to her old quarters, which I found to be the case on my returning there. In this manner we continued to play at hide-and-seek with each other for several times, until I fairly drove her



away by striking too hard at her with my net. This was at the beginning of June, when scarcely any specimens of this species were to be observed. More recently, however, towards the end of the same month, the insect became much more numerous, and one whose entire proceedings I observed was much more bold than the former. This one commenced digging a burrow, but being disturbed by me, she quitted it and proceeded to commence a fresh one close to the former; when she had proceeded about the depth of her head I observed that her jaws constituted her chief tools; with these she brought up particles of sand and bits of stone, creeping backwards to the mouth of the cell; when a little mound of sand had been accumulated she set about brushing it further from the orifice by means of her fore legs, and it was droll to see the celerity with which these limbs were moved, and the shortness of time required to remove the sand, which was thrown with force beyond the body of the insect, the head of which was kept near to the opening of the burrow. In this manner she proceeded to a depth greater than the length of her own body, so that she was entirely hidden from view for several moments at a time, re-appearing, backwards as usual, with her mouth laden with sand and stones. During the periods whilst thus hidden in the burrow I amused myself with pushing bits of stone larger than usual to the mouth of the hole in order to see her manœuvres in removing them; this she entirely effected by the assistance of her jaws, the legs not being employed in the task, even in cases where I placed pieces of stone much larger than her own body, which she removed in this manner. The largest of the three bits of stone which I now exhibit was even dragged to a short distance. During these operations a considerable buzzing noise was occasionally made. Notwithstanding these interruptions she proceeded in her work, and at length flew off. Thinking she had been frightened away I left the spot, but shortly returning, I observed her at about a yard distance from her burrow engaged in dragging along a large, smooth, green caterpillar, found, I think, upon the broom, and being that of one of the *Noctuidæ*; and I noticed that it was only by the assistance of her jaws and fore legs that she had secured her prey, the latter, which served her as arms, being clasped round the body of the caterpillar, and the four hind legs used in walking. When about half a yard distance from her burrows she set down her prey and flew off towards the nest to see that all was right, and returning again, seized the inactive caterpillar as before, and ascended the bank in a more direct and easy way than she had previously gone. On arriving at the mouth of the cell she again laid down her prey and crept into the hole, but instantly reappeared head foremost, seized the head of the caterpillar with her jaws and dragged it down. As these proceedings did not occupy more than a quarter of an hour, I feel inclined to think that as there was not sufficient time to dig a deep burrow, the cell thus made was intended only for the reception of a single larva, and that, as the sand was very loose, and so little time occupied in the operation, a fresh nest is made for each larva. Lastly, I attribute the boldness of this specimen to the circumstance of her being further *advanced in pregnancy* than the former one was, which rendered her more urgent in completing her nest.

Another common species belonging to the same genus, *Amm. vulgaris*, was flying about the same situation; its attitudes when in flight are very droll, the abdomen being held out at an angle with the rest of the body. In walking I observe that the hind pair of legs are almost useless, being dragged along behind the others, and nearly motionless. This species differs from the former in the mode of digging its burrow. It, indeed, uses its jaws, like the *A. hirsuta*, in burrowing, but when they are loaded, it ascends backwards to the mouth of the burrow, turns quickly round, flies to about a foot's distance, gives a sudden turn, throwing the sand in a complete shower to about six inches' distance, and again alights at the mouth of the burrow.

The motions of *Oxybelus uniglumis* in constructing its burrow are still more droll. This is a bustling little creature, which seems to have much difficulty in finding an agreeable situation for its hole. I have seen it commence several within a very small space, and leave them after all. As soon as it has settled on the bank it raises itself almost into an upright position by elevating the hind part of the body and extending its four posterior legs, and immediately commences with amazing rapidity the digging of its hole, its two fore legs being moved alternately, and with such quickness that it is difficult to perceive them; by this means it very soon digs a hole more than sufficient to cover itself. Mr. Shuckard tells me that it carries its prey by means of its hind legs.

Osmia bicornis, one of the mason-bees which I have observed burrowing in sand-banks, the mortar in old walls, and in rotten wood, flies off with the particles of sand or other materials dug up in forming her cell to a much greater distance, I think about three yards, returning in a direct line to the mouth of the burrow.

To what is this variation attributable? If it were for the mere purpose of preventing these particles of sand, &c., from accumulating at the mouth of the burrow, one plan of operation would be sufficient; but in some of the *Odyneri* observed by myself on Barnes Common, and in *Epipone spinipes* as Mr. Shuckard informs me, so far is this from being the case that we find them actually forming these particles into a funnel at the mouth of the cell, whilst in *Odyn. Antilope*, as described by me in the preceding Part of our Transactions, this is not the case.

Trochilium crabroniforme. This rare Lepidopterous insect has not, I believe, been found nearer London than Darenth Wood, where it is recorded by Mr. Stephens to have been seen flying heavily along in some profusion. Mr. Haworth gives the middle of July as the time for its appearance in the winged state, and Mr. Stephens says the beginning of the month. It has however been discovered by Mr. Stevens, junior, of King Street, Covent Garden, in the osier-beds on the Surrey side of the Hammersmith suspension bridge, in the last week of June, and that gentleman having kindly pointed out the spot to me, I have had the gratification of capturing the insect. The osiers are cut annually, and the stumps not above a foot high, so that when the young shoots grow up the bottom of the tree is completely hidden. It is therefore not upon the trunks of the trees, as is the case with the other species of this genus, (*Troch. bembeciforme*, which is found on the trunks of the aspen trees in Epping Forest,) but upon the leaves of the young shoots about breast-high, that the specimens which I have captured were seen. Here they sit sunning themselves, the abdomen occasionally being raised and depressed; on the least approach of danger however they fall to the ground, and are easily lost in the long grass. My specimens are males; perhaps the other sex is different in its habits.

Fœnus jaculator. This curious insect is to be observed in hot sunny weather flying about an old wall at the Kingston end of Wimbledon Common, in which *Osmia bicornis* breeds. I have met with them in this locality (first pointed out to me by Mr. Shuckard) for the three weeks preceding the July meeting of this Society. Their appearance on the wing is very remarkable; the abdomen is stretched out at full length and slightly elevated, and the hind legs are also carried at full length, and close together, the white tip of the ovipositor rendering it the more conspicuous. It flies but slowly, and Saint Fargeau states that it deposits its eggs in the larvæ of *Hymenoptera* which live in the ground in closed cells. In this instance I should rather consider that the eggs are deposited, like those of the cuckoo bees, in the nests of the *Osmia* whilst they are in progress of formation, rather than in the nest after it is completed.

Tipula longicornis, Curtis. I captured numerous specimens of this new and very striking species of *Tipula* during the first half of the month of June, in the low and damp part of Coombe Wood. Some of them were flying about the trunk of an oak tree, and I observed that they alternately rose and fell in the same manner as the *Ephemeræ*. They rested on the neighbouring bushes, but again renewed these motions upon being disturbed.

Tipula gigantea. In walking home from Coombe at dusk one evening I heard a considerable rustling of insects' wings, like those of a *Libellula* when flying amongst twigs, and immediately perceived two specimens of this insect flying across my path. Supposing them to be engaged in amatory dalliance, I seized them, and was surprised to find that they were two individuals of the male sex. In like manner I captured two male specimens of a smaller species, allied to *T. oleracea*, in the evening flying together above my head and fighting, apparently with great violence. And this reminds me that some years ago I found two male specimens of *Trichiosoma lucorum* rolling about on the ground, having seized each other with their large and powerful jaws. Deadly battles between rival queen bees have been recorded, but I am not aware that any of these encounters between individuals of the opposite sex, incited as we may, perhaps justly, suppose by jealousy, have been recorded.

Sapyga punctata. Mr. Shuckard, in his interesting memoir upon the fossorial *Hymenoptera*, published in the First Part of the Transactions of this Society, has founded some of his arguments upon the assertion of St. Fargeau, that he had captured this insect in the act of carrying off its prey, adding, however, in a note, that Mr. Bakewell had seen it thrusting its abdomen into the nests of *Osmia cærulescens*. I have lately met with numerous specimens of the female of this insect flying about walls exposed to the sun, and prying into the different holes, generally in the same manner as the Chrysides do; but I have never yet seen them engaged in forming a burrow, and indeed, from their motions, I am quite inclined to believe the assertion of Mr. Bakewell rather than that of M. Saint Fargeau, and to consider these insects as parasites, an opinion supported by the simple construction of the legs.

Methoca ichneumonides. I have captured this insect at Blackgang Chine in the Isle of Wight, in the month of August, and at Low-Cross Wood, between Dulwich and Sydenham. In both localities I have found it in hot sandy spots exposed to the noonday sun, where little clumps of short grass were to be observed. The insect is exceedingly wary, and endeavours, on being disturbed, to retreat amongst the roots of this grass.

Miscophus bicolor. On the 16th July, 1825, I captured the only two specimens recorded as British up to the present time, flying over hot sunny sand-banks at Coombe Wood. Since that period I have frequently, but in vain, sought for the insect in the same locality, but during the present fine season I have been more successful. In the beginning of the month of July I noticed a small sand-wasp burrowing in one of the banks in the same place, which, although I was unable to secure it, had so much the appearance of the insect in question, that I was induced to repeat my visit to the spot, and at length, after several journeys, I had the pleasure to see three specimens flying over another of the banks. One of these at length settled, and I perceived it at its work of burrowing in the same manner as I have above described in the account of *Ammophila hirsuta*. So intent was the insect that I secured this specimen with my fingers. Immediately afterwards another settled precisely on the same spot as the former, which I also secured, as I did also the third, which in like manner flew to the same spot. Now, on examining the fore legs of the female of this rare species, the tarsi are not strongly spined at the sides, and the tibiæ scarcely exhibit any ciliæ at all. And yet this insect is a true sand-burrower.

Cerceris læta. This beautiful insect abounds on the northern extremity of the Vale of Health on Hampstead Heath. Here on the 24th July I observed numerous specimens of both sexes flying over the flat ridges of the sand-banks, in which were many of their burrows. It was not long before I perceived one of the females laden with her prey, which consists of *Strophosomus* —— ? (*one of the Curculionidæ*). Having captured this specimen in my net, I perceived that when walking up its sides she made use of all her legs, holding the snout of the weevil with her jaws alone. I endeavoured subsequently to ascertain the mode of the employment of the legs when on the wing, in order to ascertain the use of the spines upon the hind legs, respecting which, it will be seen on referring to Mr. Shuckard's memoir on the indigenous fossorial *Hymenoptera*, published in the first number of the Transactions of this Society, that some uncertainty exists. This, although difficult, I was enabled satisfactorily to ascertain by a little manœuvre. The females, on arriving with their prey, descend with it suddenly into the burrow, giving no opportunity of observing this; I therefore closed the mouth of one of the cells towards which one of the laden females was descending, so that when she approached she was unable to find her burrow, and kept flying very slowly about the spot, enabling me to perceive that the four fore legs are occupied in supporting the prey, the hind legs alone being extended. The males were less numerous than the females, but they kept hovering about the mouth of the burrows, flying upon the females when they approached to their work.

Crabro (*Corynopus*) *tibialis.* I observed this rare species of *Crabro*, whilst in company with the Rev. F. W. Hope, flying over the laurels in the grounds at Netley in Shropshire, one of the seats of this gentleman's family; but the cause of my mentioning its capture at the present time is to notice the curious statement of MM. Saint Fargeau and Brullé, contained in their monograph upon this genus in the third volume of the 'Annales de la Société Entomologique de France,' p. 963, that (contrary to the universally received opinion of entomologists, that the antennæ of all male aculeate *Hymenoptera*, except *Ceramius* and *Masaris*, have 13 joints,) some species of *Crabro* form exceptions to this rule, the males having only 12 joints, whilst the abdomen has the ordinary number of joints of the male. Amongst the insects stated to be thus organized is the *Crabro tibialis*, Pz. F.G. 83.14, forming the genus *Corynopus* of this monograph, and of which the antennæ of the males are described thus, "Presque filiformes, de douze articles apparens, le quatrième fortement échancré en dessous," p. 803. Notwithstanding this description, with the assistance of a lens of very moderate power, thirteen distinct joints are to be perceived, as represented in Plate XXII., fig. B.; according to which figure it will be seen, from the description given by the French authors of the fourth joint being notched, that they must have overlooked the true third joint, as it is the fifth which is most strongly notched; the third is indeed small, but forms a very distinct cup, receiving the base of the fourth joint.

Another peculiarity exhibited by this insect exists in the curious structure of the basal joint of the anterior tarsi in the males, which is longer than all the remainder of the tarsal joints, united and furnished with a broad wing-like membrane of a thin consistence, quite unlike the dilatation observed in the males of some of the species of the genus *Crabro*. In their description of this insect MM. St. Fargeau and Brullé have not mentioned the construction of the male tarsi, but in their synoptical table of characters distinguishing the males of the group Crabronites, they incorrectly state that the anterior tarsi are simple.

This insect is placed in the English catalogues under the genus *Rhopalum* of Kirby, of which no description having been yet published, the name must sink into a synonym of *Physoscelus* employed by MM. Saint Fargeau and Brullé for the *Crabro rufiventris* of Panzer; but the differences between *Physoscelus* and *Corynopus* exclusive of the incorrect description of the antennæ noticed above, consist merely in a slight variation of the form of the extremity of the abdomen.

Trypoxylon figulus. The name of this genus was proposed by Latreille, in allusion to the supposed wood-boring habits of the insects of which it is composed. Of these habits the first indication was given by Linnæus, who says of his *Sphex figulus*, upon the authority of Bergman, " Habitat Upsaliæ in parietum ligneorum foraminibus ab aliorum insectorum larvis factis relictisque quæ primo purgat circumroditque, deinde fundum argilla obducit, cui araneam imponit, eique ovulum concredit quo facto nidum argilla claudit. Larva apoda pallida larvisque apum similis, consumta aranea, membranam luteo fuscam et teneræ pupæ aptissimam net. Una mater perplurimos nidos construit et plerumque non ultra biduum in quovis adornando consumit: alæ abdomine breviores, abdomen petiolatum atrum, marginibus segmentorum lucidis, si quis eos a capite oblique intereatur[*]."

M. de Saint Fargeau however, finding that the legs of the female are not provided with ciliæ, and consequently, according to his theory, unfitted for the formation of a nest or the obtaining of a supply of food, has considered the statement of Linnæus, which has been adopted by subsequent authors, as erroneous, and as rather applicable to certain species of *Pompili*, especially *Pompilus petiolatus*, Vander Linden, which indeed the French authors regard as agreeing with the *figulus* of Linnæus both in characters and habits[†].

Mr. Shuckard also, in the First Part of the Transactions of this Society[‡], has considered *Trypoxylon* to be parasitic; "as it is a very common insect constant opportunities occur for detecting it with its prey were it predatory." When the preceding observations were read by me before the Society I adopted the opinion of Saint Fargeau, having repeatedly watched the *Trypoxylon*, and observed it entering successively into the burrows of other insects upon a sandbank, in the same manner as other parasitic species, having also captured *Pompilus petiolatus*, with its prey, consisting of a large spider[§], and no instance being yet recorded of a fossorial species not constructing its own burrow, but making use of the habitation of other insects.

Since these observations were read, Mr. Shuckard has informed me that he has captured *Trypoxylon* carrying its prey, consisting of a spider; and within the last few days I have been yet more fortunate in watching the œconomy of this insect, and thereby ascertaining the complete correctness of the Linnæan account. On the 9th July, 1836, I discovered a large female *Tr. figulus* sitting on a leaf holding a spider with her jaws and fore legs, and with which she flew off. I watched her flight, and she appeared to enter the open hall-door of my residence, but the laurels which grow near it prevented me from seeing where she deposited her load. A few hours afterwards however, whilst standing at the door (in the side posts of which various fossorial *Hymenoptera* had taken up their abode), I heard a scratching noise in one of the open burrows, and immediately afterwards the *Trypoxylon* made her appearance at the mouth of the hole and flew off. I then stopped up the hole with a small pebble, and the next day I ascertained that I had been assisting the insect in so doing, as I saw her busily occupied in fetching small loads of moistened sand with which she was plastering up the little crevices which still remained.

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[*] Syst. Nat. ii. 943. [†] Encycl. Méthod. vol. x. p. 750. [‡] p. 56.

[§] I have published an account of the habits of this insect in the 'Annales de la Société Entomologique de France,' for the present year.

Two days afterwards I observed another burrow, which I had not noticed before, filled with newly made powdered wood, and the *Trypoxylon* was now busily occupied in making a cell at the bottom of the hole with moistened sand. That the burrow was newly formed was evident from the quantity of fresh-powdered wood with which it was filled, and that the *Trypoxylon* was the architect I infer from there being no other fossorial species then at work in the perfect state in the door-post.

The spider which *Trypoxylon* selects appears to be the young of *Epeira diadema*, which is now of small size, and of a greenish colour, and which suspends its geometric web amongst the branches of shrubs. The prey of *Pompilus petiolatus* is a much larger silky species of *Lycosa*. As regards the doubts of M. de Saint Fargeau relative to the specific identity of *Trypoxylon figulus* with the *Sphex figulus* of Linnæus, it is quite evident from the shortness of the wings, and the lucid margins of the abdominal segments of the Linnæan description, that it, and not *Pompilus petiolatus*, is the insect described by Linnæus. I might have added some observations upon the effect which the facts thus confirmed will have upon the theory of M. de Saint Fargeau, but his views have been so much weakened by the memoir of Mr. Shuckard, as well as by some observations of mine read before the Entomological Society of France, that further discussion upon the merits of this theory seems uncalled for.

Species of Coccus infesting the Pine-apple.—On examining the leaves and fruit of the pine-apple exhibited by J. G. Children, Esq., at one of the meetings of the Entomological Society in 1835, I observed two distinct species of Coccideous insects parasitic upon them, belonging in fact to two different genera, and having very different modes of transformation and oviposition.

The species which infests the leaves, and which I should imagine from its smaller size must be the least obnoxious of the two, is more properly a scale insect, or true *Coccus*, than the other. The male larvæ when full grown are of an oval and flattened shape. They then become stationary, and by degrees an elongated double pellicle, of a thin texture and white colour, is added to the extremity of the body in some way or other, I suppose by secretion. This pellicle becomes a true cocoon for the pupa, which is detached from it within, just as in the Muscideous pupæ the skin of the larva becomes the cocoon, inclosing a distinctly formed incomplete pupa within. In the specimens which I have examined, the pellicle (with the cast external skin of the larva attached) alone remained, the pupa and imago not being perceivable. Hence I have no doubt that the males had simultaneously arrived at the perfect state previously to the leaves being plucked, made their escape, impregnated the females, and died. Here indeed is clearly no continuous production of the individuals as asserted by Bouché in his account of the *Coccus Bromeliæ*; I should, on the contrary, say only an annual one. The female larvæ when full grown become stationary for the remainder of their existence, and cover themselves, as I imagine by secretion, with a thin scale or pellicle of a circular form, much larger than the male pellicle; beneath this pellicle the fleshy-bodied female is easily discovered, but dead, having in most cases several minute eggs or already hatched young ones beneath her body.

The species which infests the fruit continues active all its life; at all events this is the case with the females; the males I have not discovered; and at the time when this observation was made the females might be perceived in the act of depositing their eggs in the midst of the cottony mass which gives so unsightly an appearance to the fruit. The form of the body of this female is quite unlike that of the other species, being provided with numerous lateral rays and covered with a downy kind of powder. The insects which are at the crown of the fruit are of a smaller size than those at the bottom, and not occupied in depositing eggs. Hence we may suppose that the production is in this species continuous, but in as much as the body of the females and young is never covered with the scale-like secretion observable in the others, the application of remedies will be less difficult and more sure of success than in the latter; indeed it seems evident that the most effectual period for attacking the pine-leaf *Coccus* must be that when the young and tender larvæ are first bursting forth from beneath the scale of the female. M. de Wael tells me that an infusion of colloquint is very efficient in destroying these insects applied with a brush or syringe.

XLIII. *A Description of the superior Wing of the* Hymenoptera, *with a view to give a fuller and more certain Development to the Alary System of Jurine. By* W. E. Shuckard.

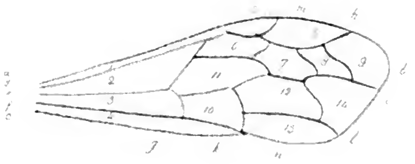
[Read March 2, 1835.]

Plate XVIII.

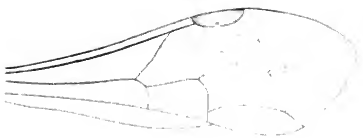
The anterior or superior wings of the *Hymenoptera* were first applied by Jurine the elder of Geneva to their distribution into genera, from the relative disposal of some of the nervures with which they are observed to be more or less intersected. He had a strong partiality for this order, and feeling dissatisfied with the characters derived from the mouth made use of by Fabricius, as evidently tending to mislead,—for they even misled their celebrated author,—and as being difficult of access, and in unique insects dangerous to investigate, he was induced to seek for external characters which would prove more satisfactory in their results and not absolutely demand a skilful or practised hand in their inspection, a correct eye being all that was required; and after either a laborious examination, or by a lucky chance, or possibly led by the hint given by one of his predecessors, Harris or Kirby, who had both however neglected to elaborate the discovery, he found that the similarity of the neuration of the superior wings grouped these insects into divisions, the species whereof, in the majority of instances, agreed in general structure, habits, and œconomy. He however limited his use of these nervures to the longitudinal and transverse ones placed beyond the stigma of the wing, and forming the radial or marginal, and the cubital or submarginal cells, with the one or two recurrent nervures springing from the latter. This system has since been very generally followed, and almost exclusively used in that division of the aculeate *Hymenoptera* which comprises the *Fossores*, or burrowers, but in the other divisions it is sometimes of primary, and at others of subsidiary importance.

The appended comparative view of what other writers have done with respect to the neuration of the wing will show how far I have diverged from them, and they from each other. The inconvenience of some of the systems will be observed from several nervures and cells having double names, as well as from others being left unnamed, or named collectively, which tends to create both confusion and doubt.

1



2



Several circumstances concurred to lead me to a studiously careful inspection of the neuration of the superior wing throughout the order; and the result has been the discovery of a nervure which, by the degree of influence it exercises over several that are subservient to it, will, I expect, afford important assistance in reducing to order some of the yet comparatively chaotic tribes. Upon making this discovery my first object was to ascertain the name of this nervure, for I could not remember that any had been applied to it; and, as I had surmised, I sought in vain, for no full and detailed description of the wing has as yet been given; and I considered that before I proceeded with the elaboration of my discovery it would be both useful and desirable to give a full description of the reticulation of the nervures upon the superficies of the wing, and to apply individual names to such as had as yet been either neglected, or named in conjunction with others. I have taken the wing of *Gorytes mystaceus* as my type, for I consider it the most perfect in the order, and of which the rest are only modifications or aberrations. I candidly admit that I ought to have restricted myself to merely naming the hitherto anonymous portions, but I thought that if I did so it might tend possibly to confuse; I have therefore preferred incurring your censure by the recapitulation of what has been already done before me, that I might give greater lucidity and precision to my own views, and in consideration that a full description of this organ has never yet been given in one tablet.

The contour of the wing is formed by its anterior, apical, and posterior margins. The *anterior margin* is that portion which is situated anteriorly upon its expansion in flight, extending from its base to the distinctly visible extremity of the costal nervure, a little beyond the marginal cell; at its termination the *apical margin* commences, and extends to the *sinus* of the wing, which is the incision at the apex of the *posterior margin*, which latter extends from this sinus back to the base, and it is by this margin that the upper and under wings are connected in flight. The *costal* nervure is the first longitudinal nervure of the wing, and, as we have seen, extends upon the anterior margin to just beyond the extremity of the marginal cell. The second longitudinal nervure is the *post-costal*; this extends to the *stigma*, which is that thickened point or spot upon the wing placed upon its anterior margin at about two thirds of the distance between its base and extreme apex, and appears to me to be a dilatation of the costal nervure.

[illegible] third longitudinal nervure is the *externo-medial*, which pro[illegible] in a direct line nearly parallel with the preceding for a little more than half the length of the post-costal, or about one third of the entire length of the wing, and then leads off at an obtuse angle to join the post-costal just before its junction with the stigma. The *anal* is the fourth longitudinal nervure, which also extends from the base to the sinus at the apical extremity of its posterior margin: a transverse nervure unites the externo-medial and anal, and which I propose calling the *transverso-medial*. These nervures, which I consider the primary nervures of the wing, severally inclose what have hitherto been called collectively the basal or humeral cells, but to which I purpose applying different names (derived from the nervures which inclose them), that they may be the more readily distinguished from each other. The first, or that very narrow one between the costal and post-costal nervures, is the *costal* cell; the second is that placed between the post-costal and externo-medial nervures and which I call the *externo-medial* cell: that inclosed between the externo-medial and anal nervures parallelly, and terminated at its apex by the transverso-medial, is the *interno-medial* cell; and the cell seated between the anal nervure and the posterior margin of the wing is the *anal* cell.

From the interior margin of the stigma arises the *radial nervure*, which makes a curve and then joins the costal upon the margin of the wing: the lanceolate space thus inclosed forms what is called the *radial* or *marginal* cell. The *cubital nervure* is nearly parallel with the radial, and originates from the externo-medial near its junction with the post-costal; this extends to the apical margin of the wing just below its extreme apex. The space thus inclosed is divided by three transverse nervures, which I propose calling the *transverso-cubitals*, inclosing as many spaces forming so many cubital or submarginal cells, a fourth being formed in consequence of the cubital nervure extending to and joining the apical margin. The third nervure, originating from the primary nervures of the wing, is what I call the *discoidal* nervure,—(it is from this that I anticipate the chief results),—and which, commencing at the transverso-medial, extends in a direct line to the disc of the wing directly between the stigma and the sinus, when it makes a sudden curve at a right angle backwards and joins the anal nervure close to the sinus. From this discoidal nervure at the centre of its apical return another springs, forming what I call the *subdiscoidal* nervure, and which here extends to the posterior margin of the wing. From the cubital nervure two others originate; these are called the *recurrent* nervures, the first of which always inosculates at the angle of the discoidal nervure, and the second just beyond the centre of the subdiscoidal. By the reticulation of these four nervures several cells are formed upon the disc of the wing; the first of these, which is inclosed between the discoidal and anal nervures, I call the *first discoidal* cell; the *second* is that placed between the externo-medial cubital, first recurrent, and discoidal nervures; the *third discoidal* cell is that inclosed by the second recurrent, subdiscoidal, discoidal, and first recurrent nervures. The space inclosed between the second recurrent, subdiscoidal, and cubital nervures, and the apical margin of the wing, forms the *first apical* cell, and there is a second only when the subdiscoidal nervure extends to the apical margin, by which and a portion of the discoidal cell it is inclosed.

This completes the description of the nervures and the cells of the wing. I will add a few observations, premising that I have never departed from the nomenclature of my predecessors but where, from the co- and sub-ordination of the nervures and cells it was requisite to do so to give the description greater precision.

The costal nervure (Latreille, Kirby, St. Fargeau,) is the radius of Jurine and Gravenhorst. It extends from the base of the wing generally to the extremity of the radial or marginal cell, and where this is open or incomplete, as in the females of *Tiphia*, it still extends nearly to where it would have been closed by the radial nervure, or to opposite the termination of the latter, as in *Stilbum*, *Leucospis*, &c.; but where there is no radial nervure it terminates at the stigma, as in *Meria*, and it generally dilates near its termination into a round opake spot, which is the stigma of the wing, but which is occasionally obsolete. It derives its name from lying parallel when in repose with the sides of the insect.

The post-costal nervure of Latreille and Kirby is the cubitus of Jurine, and occasionally coalesces with the preceding. These two nervures inclose my costal cell, which is however wanting when they unite. In the genus *Lyda* the interior of this cell is occupied by a nervure springing from its base and terminating in a fork, the prongs of which join the limitary nervures; sometimes, as in *Lophyrus*, a transverse nervure cuts it asunder.

That the true course of the next nervure, the externo-medial, is that which it is described to take in the type,—namely, to run obliquely up to the post-costal in preference to its apparent course by inosculating sometimes at its salient angle with the discoidal and transverso-medial nervures, as in many of the *Securifera*, the normal and aberrant *Ichneumons* among the *Pupivora*, and several of the *Heterogyna* and *Fossores*,—is proved to be correct by the majority of those tribes, the whole of the *Diploptera*, and most of the *Mellifera*, in which it could not take the other course without an evident distortion[*], and is confirmed by its separate and distinct existence in

Neurospora *. The externo-medial cell inclosed by it is always a variously modified transverse triangle.

The transverso-medial nervure invariably inosculates at the salient angle of the externo-medial when the discoidal nervure springs from the same point or from the transverso-medial: but always when the discoidal nervure springs from the exterior of the externo-medial, which it generally distorts, as will be hereafter shown, the transverso-medial is regular, and generally directly transverse; this formation occurs in *Larra*, *Tachytes*, *Miscophus*, *Astata*, *Crabro*, &c. In the *Diploptera* it is placed much nearer the base of the wing than in the other tribes. The cell, my interno-medial, to which this forms the closing apex is crossed transversely, and divided into two by a pseudo-nervure in the genus *Lyda*.

The anal nervure generally joins the posterior margin of the wing at its apex, where it terminates at the sinus; but in *Sphex* and some other genera its positive junction is obsolete, being merely slightly traced, and sometimes this union is entirely obliterated, as in *Scolia*.

The anal cell is occupied in many of the *Securifera* by either an undulating nervure as in *Cimbex*, *Pachylosticta*, *Sirex*, *Tremex*, &c., or by merely a transverse one as in *Cephus*, or by both as in *Lyda*.

These cells, to which I have given individual names, derived from their limitary nervures, are what constituted collectively Jurine and St. Fargeau's brachial cells, and Gravenhorst's humerals, and the basal cells of other writers. The nervures above described, by which they are inclosed, I consider the primary ones of the wing, as the existence of the rest is wholly dependent upon them.

The rest comprise the secondary nervures.

The marginal cell is cut transversely, chiefly in the *Terebrantia*, by one or two nervures which I call the transverso-radial; they can be named only in the order of their succession, their separate and distinct existence not being dependent upon their position or inosculation. We have but one instance of there being two, viz., in the genus *Xyela*: when there is but one transverso-radial nervure across the body of the cell there are two cells, as in many of the *Securiferæ*; but when this transverse nervure is removed closely to the apex of the radial cell, the latter is then called appendiculated, whether the portion thus separated be open, as in *Astata*, or closed, as in *Hylotoma*,

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* This insect, which is unique in my own cabinet and as yet undescribed, is evidently allied to *Paxylomma*, Breb., the *Plancus* of Curtis. Their true situation appears to me to be between the *Ophiones* and *Adsciti*, where *Pelecinus* and *Stephanus* ought to come, for *Pelecinus* has certainly no connexion with the *Evaniales*, nor are the latter in their proper place unless the relative situation of the groups which follow be much remodelled.

Larra, *Palarus*, &c. The cubital nervure originates generally either towards the extremity of the externo-medial near the stigma, or from the centre of its bend upwards beyond the salient angle; but as a rare exception we find it in *Fœnus* springing from the salient angle. When the first and second transverso-cubital nervures unite, prior to their junction with the radial nervure, the second submarginal cell is called petiolated, as in *Miscophus*, *Pison*, *Nysson*, *Cerceris*, &c.; when this happens to the second and third transverso-cubitals, it is the third submarginal cell which is petiolated, as in *Miscus*, but this formation is of very rare occurrence. The most important of the secondary nervures is what I have called the discoidal nervure, from the circumstance that no discoidal cell or recurrent nervure can exist without it; it originates sometimes from the point of union of the externo-medial and transverso-medial nervures, sometimes from the externo-medial itself after it has left the transverso-medial, and sometimes from the latter. It always shows a strong tendency to draw the nervure with which it inosculates outwards towards the disc at their point of contact, and it will be found, in conjunction with the other nervures, to yield very good subsidiary characters: it always returns upon the anal nervure, which it joins near the sinus. At its discoidal angle the first recurrent nervure invariably inosculates; and from near the centre of its posterior return springs the subdiscoidal nervure, upon which depends the existence of the second recurrent.

I have arranged my order of the discoidal cells differently to St. Fargeau, for I treat them in relation to their consequence; as we invariably see that where there is no discoidal nervure (which when it exists always incloses the first discoidal cell,) there is never a recurrent nervure, which always inosculates with it, forming the exterior of the second discoidal cell, and thus consequently subordinate to it; and proceeding upon the same principle we find that the third discoidal cell never exists but where there is a subdiscoidal nervure, with which the second recurrent nervure inosculates, forming the exterior boundary of that cell. The second recurrent nervure stands in the same subordination to the subdiscoidal as the first recurrent does to the discoidal, for it has never a separate existence, although the subdiscoidal nervure is sometimes found alone. It will be thus seen that I have not given the discoidal nervure undue importance, as upon its existence hangs that of the first recurrent, subdiscoidal, and second recurrent nervures, and consequently of all the discoidal, submarginal, and apical cells. By not taking this view, which careful investigation proves to be correct, St. Fargeau has unjustly charged Jurine with having erred in saying that a first recurrent nervure exists in his genus *Anomalon*; this is evidently the fact, and St. Fargeau himself is distinctly in error, for otherwise in this genus the cubital nervure would originate from the discoidal, which can never be the case, as it is proved by analogy invariably to arise either from the base of the stigma, or just below from the exterior of the externo-medial nervure, which in that genus, and indeed throughout the normal *Ichneumons*, the anterior portion of the cubital nervure is deficient, thus merging the second discoidal in the first submarginal cell. This is the case also in the genus *Oxybelus* amongst the *Fossores*; in *Paxylomma*, *Chelonus*, several *Microctoni*, and *Aphidii*, amongst the aberrant *Ichneumones*; in *Helorus* amongst the *Oxyurites*; and by a peculiarity in this genus the above two cells are not separated from the externo-medial cell, owing to the upper half of the externo-medial nervure between its salient angle and the stigma falling back upon the anastomosis of the recurrent nervure with the salient angle of the discoidal nervure, thus inclosing a triangular portion of the second discoidal cell. And that this is correct is evidently proved by the existing remainder of that first portion of the cubital nervure, found most strongly in the approximate genus *Ophion*, as well as in *Trogus*, *Echthrus*, *Rhyssa*, and the majority of the genus *Ichneumon*; for there is decidedly no anomaly of structure in this tribe, but merely the suppression of that portion of the cubital nervure which would have formed half of the first cubital cell at the junction of the first recurrent nervure with it. The discoidal cells I have named in reference to their position and existence, being influenced by the discoidal nervure, and the apical cells from their situation upon the apical margin.

The following I consider their relative value in point of organization.

1. The primary nervures in their consecutive order.
2. The radial or marginal nervure.
3. The discoidal nervure.
4. The first recurrent nervure.
5. The cubital nervure and its transverso-cubitals.
6. The subdiscoidal nervure.
7. The second recurrent.

And that this is their true natural gradation I feel fully persuaded, and willingly invite the fullest, but at the same time candid and unprejudiced, investigation. I am fearful that the repetition of terms (which was important to the full elucidation of my views) may have proved tedious; I will therefore no longer detain you upon this subject, but will defer its practical application to our next meeting, when I hope to prove more fully the extent of its value, and which I expect to render more interesting than the present paper could possibly be, by the intercalation of desultory remarks upon several genera.

XLIV. *Monograph on the Coleopterous Genus* Diphucephala, *belonging to the* Lamellicornes. *By* G. R. Waterhouse, *Esq., M.E.S., and Curator to the Zoological Society of London.*

[Read 2nd November, 1835.]

Diphucephala, *De Jean.* Plate XXII. fig. 1—6.

Corpus oblongum: abdomen ventre valde convexo et fere gibbo: clypeus antice profunde emarginatus: mandibulæ breves, subarquatæ: maxillæ mandibuliformes, apice tridentatæ: palpi maxillares articulo basali brevi, articulo terminali robustiore, coniformi; mentum subtriangulare: antennæ 8-articulatæ, clavâ triphyllâ: tarsi maris antici articulis 4 primis dilatatis, subtus pubescentes.

Obs. A narrow portion of the clypeus extends backwards on to the eye, and in all the species I have examined is furnished with a tuft of pale hairs. The prevailing colour of the species of this genus (which appears to be confined to Australia) is of a metallic green, varying to shades of a brassy, golden, or copper-like hue. The principal generic character consists in the deeply emarginate clypeus, a character which at once distinguishes *Diphucephala* from its allies, *Serica*, *Macrodactyla*, and other genera of the *Phyllophaga* in which, like our present genus, the claws are bifid *.

The twelve species of *Diphucephala* I have examined appear to be allied to each other thus:

D. SERICEA.

CHILDRENII,
HOPEI,
AFFINIS,
EDWARDSII,
SPLENDENS,
PULCHELLA.

PILISTRIATA,
CASTANOPTERA,
AURULENTA,
PARVULA.

SPENCII.

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* It is worthy of observation that in this character, of the bifid claws, there exists an analogous structure to that of the bees. The analogy is the more perfect

Several of the species of *Diphucephala* very closely resemble each other, and might easily be confounded unless minutely examined; and as in writing this monograph it has been essential that I should do so, it occurred to me that much time might be saved to those who may use the following descriptions in investigating the species, were I to make a few preliminary observations upon the characters which have been chiefly chosen by me for their separation.

With respect to the form, the deeply emarginated clypeus has been mentioned as a generic character; there is however considerable variation as to the *extent* of the emargination, and the form of the lateral processes, as I have termed the projecting parts of the clypeus, caused by the deep emargination.

In *D. sericea* the emargination in the males is moderate. In *D. Childrenii*, *Hopei*, and *affinis* the emargination is very deep, and the projecting processes either have the inner edges parallel with each other, or else their apices are somewhat approximating. In *D. Edwardsii* the emargination is also deep, but the lateral processes are slightly diverging. *D. splendens* and *pulchella* have the emargination of the clypeus moderate, the projecting processes not very wide apart, but diverging at the apex. In the remaining species the clypeus is not deeply emarginated, and the projecting processes (in all excepting *parvula*) are wide apart and diverge at the apex.

The length of the thorax is generally about equal to the width (which is slightly narrower than the elytra); it always has the anterior part truncated, the posterior margin dilated in the region of the scutellum, and the posterior angles more or less acute. The lateral margins are always straight, and parallel with each other, posteriorly; dilated in the middle, and from thence contracted gradually to about the same width as the head. In *D. pulchella*, *aurulenta*, *pilistriata*, and *Spencii* the dilated part of the lateral margin is produced into a tooth-like process; in the remaining species it is rounded or somewhat angular.

since in our present subjects, as well as in bees, there is a similar difference in the structure of the claws of the two sexes. In the males the divisions of the bifid claws are of equal length or nearly so; whilst in the females the inner portion of each is considerably shorter than the outer; the claws are also less deeply cleft in the females. In the sexes of *D. sericea* these characters are very evident. In the male of *D. splendens* the inner division of the claw is not quite so long as the outer, (in which respect this species differs from the same sex of the foregoing, as in that they are quite equal,) still between the male and female there is an evident difference in the proportionate length, as may be seen by comparing the drawings.

I should not have dwelt upon these points, but it appeared that by thus observing the same peculiarities in different orders, which nevertheless resemble each other in some of their habits, we may gain a clue to the discovery of the uses of such structure.

As regards sculpture, the thorax is always furnished with a dorsal channel more or less distinct; this is a simple groove in all the species excepting *D. aurulenta* and *parvula*, in which it is very broad, and divided on the basal half of the thorax by a longitudinal elevated smooth ridge; or we may describe the thorax of these species as having a dorsal channel on the fore part *only*, (which is indistinct in *parvula*, and rather deep in *aurulenta*,) and posteriorly having two longitudinal foveæ.

All the species have a fovea on each side near the lateral margin and at the dilated part of the thorax: these foveæ are very large and extend from the margin (where they are broadest) to the dorsal channel, and form a transverse depression in *D. pilistriata, castanoptera, aurulenta*, and *parvula*; in the remaining species they are confined to the margins. In *D. pulchella* they are very large and rather deep.

The anterior tibiæ have generally the external part produced, beyond the base of the tarsus, into a pointed process: behind this, and still on the external part, there is another pointed, or tooth-like process; where this obtains I have described the tibiæ as bidentate externally. There is also, in some of the species, a tooth-like process springing, and projecting at right angles, from the apex of the inner part of the tibia; this last character is peculiar to the males, and is found only in *D. Childrenii, Hopei, affinis, Edwardsii*, and *splendens* *. *D. affinis* has the outer portion of the anterior tibiæ but slightly elongated and the adjoining tooth indistinct, in which respect it differs from those species nearest allied. In *D. splendens* the two outer processes are closer together than in either *D. Childrenii*, or *Edwardsii*, and the apical one is recurved.

In *D. splendens* and *Hopei* (and in the females only) there are two short spines on the under part of the basal joint of the tarsus; a character which separates them from allied species; the simple anterior tibia will render it easy to distinguish *D. Hopei*.

Species 1. D. SERICEA.

Melolontha sericea. Kirby, in Linn. Trans., vol. xii. p. 463.

D. viridis, supra sericeo-nitida, pilis sparsis decumbentibus, subtus ex pilis albis decumbentibus incana: capite punctulatissimo: thorace subconico, confluenter punctulatissimo, superne subcanaliculato, ad latera subspinoso: scutello acuminato, triangulari, leviter in medio depresso, lævissimo: elytris subseriatim punctatis, lineis duabus longitudinalibus elevatiusculis: pedibus rufescentibus, pilis niveis obtectis; tarsis piceis; tibiis anticis ad apicem obsoletè bidentatis.

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* Not having seen a perfect male of *D. pulchella*, I am not aware whether it possesses this character. *D. castanoptera* is another species which I must omit to notice, not having one by me at present to examine.

Long. corp. 4—5 lin.

Obs. The two tooth-like processes at the apex of the anterior tibiæ, in this species, are obtuse and placed rather close together; the terminal segment of the abdomen is nearly of the form of an equilateral triangle, finely punctured, convex, and partially covered with white decumbent hairs.

I am indebted to the original describer of this species (the Rev. W. Kirby) for the loan of a specimen for examination, and likewise to the Rev. F. W. Hope and J. G. Children, Esq., for the loan of several specimens of both sexes. There are specimens in the collections of the Entomological and Zoological Societies, and the British Museum, which I have examined.

Sp. 2. D. Childrenii.

D. viridis, supra sericeo-nitida, subtus pilis albis decumbentibus: capite confluenter punctato: thorace sub lente punctulatissimo, dorso subcanaliculato: elytris subseriatim punctatis: tarsis cyaneis; tibiis anticis bidentatis.

Long. corp. 4—5 lin.

Obs. This species is the only one, excepting *D. sericea*, which has a silk-like gloss on the upper surface of the body. The head and thorax are of a dull golden green colour; the elytra are of a bluish green, and the margins and suture frequently of a brighter and gold-green hue; they are rather faintly punctured (as in *D sericea*); the punctures are disposed in striæ and scarcely confluent. The terminal segment of the abdomen is somewhat triangular, very sparingly furnished with yellowish white pubescence; the sides and a longitudinal patch in the centre are bare: in the female there is a longitudinal fovea in the middle and one on each side. The scutellum is smooth and in the form of an equilateral triangle: the anterior tibiæ are bidentate externally, and furnished with a distinct tooth internally at the apex.

Through the kindness of J. G. Children, Esq., who has lent me all his specimens of *Diphucephala* for examination, I have been enabled, since the reading of this paper, to add two new species, *D. affinis*, and the one above described, which I have taken the liberty of naming after that gentleman.

Sp. 3. D. Hopei.

D. viridis, subtus pilis albis decumbentibus: capite confluenter punctato: thorace obscure viridi, sub lente punctulatissimo, dorso subcanaliculato: elytris nitidis, subseriatim punctatis, lineis duabus longitudinalibus elevatiusculis: tarsis cyaneis; tibiis anticis inermibus.

Long. corp. 4—5 lin.

Obs. In this species the thorax is dull in the male, being finely shagreened: in the female it is slightly glossy, and punctured; the lateral margins are slightly pubescent; the scutellum is impunctate, and impressed with a fovea in the middle. The anterior tibiæ are without the usual tooth near the apex, and the basal joint of the anterior tarsus in the female is armed beneath with two spines; the terminal segment of the abdomen is thickly punctured, slightly convex, and covered with decumbent yellowish hairs; in the female this part is impressed with an impunctate longitudinal fovea in the middle, which part is destitute of hairs.

The Rev. F. W. Hope received many specimens of this insect from the Swan River, which he lent me for examination. Some he has deposited in the collection of the Entomological Society. I have named the species after this gentleman, in testimony of the many kindnesses I have received from him.

Sp. 4. D. affinis.

D. viridis, nitida, subtus pilis albis decumbentibus: thorace punctulatissimo, dorso subcanaliculato: elytris subseriatim punctatis: tarsis cyaneis; tibiis anticis sub-bidentatis.

Long. corp. 4—4½ lin.

Obs. *D. affinis* is rather more brilliant in colour than its immediate allies. The body is of an uniform bright green above; the head and thorax of the male are a little less glossy than the elytra; the clypeus is deeply emarginate; the head is slightly rugose; scutellum smooth and triangular. The thorax of the female is distinctly punctured; the puncturing on the thorax of the male is much less distinct. The terminal segment of the abdomen is somewhat triangular, very sparingly furnished with minute decumbent hairs, and alike in both sexes, excepting that in the female it is rather shorter than in the other sex. The anterior tibia (which is bidentate externally) has the outer part produced at the apex; this portion is not pointed (as in most of the species of this genus), but truncated. The males are furnished with a tooth-like process internally at the apex.

In the collection of J. G. Children, Esq.

Sp. 5. D. Edwardsii (*Kir. MSS.*).

D. viridis, subtus pilis albis decumbentibus: capite cupreo: thorace obscure punctulatissimo, dorso subcanaliculato: scutello punctulatissimo: pedibus cupreis, tarsis viridi-cyaneis; tibiis anticis bidentatis.

Long. corp. 4—4½ lin.

Obs. This species is rather smaller than either of the foregoing, and appears to be rather more variable in colour, some being green and others cupreous. It has the clypeus deeply emarginated, the projecting portions narrow and diverging. The head is flat above, and uniformly rugose. The thorax in the male is dull, and in the female rather glossy and minutely punctured. The dorsal channel is indistinct, the lateral foveæ are small, and the lateral margins are produced into an obtuse angle in the middle. The scutellum is finely punctured. The elytra are rather short in proportion to the head and thorax, especially in the males. Terminal segment of the abdomen alike in both sexes, nearly flat, (under a strong lens,) finely punctured throughout, and sparingly furnished with decumbent hairs towards the apex.

The anterior tibiæ are bidentate externally, and furnished with a tooth-like process internally at the apex.

Described from specimens lent me by the Rev. W. Kirby; they were procured from the Swan River. These specimens, together with several others, are now in the collection of the Entomological Society, having been presented with that gentleman's collection.

Sp. 6. D. splendens, (*MacLeay*, in Appendix to Capt. King's Narrative of a Survey of the Intertropical and Western Coasts of Australia, p. 440.)

D. viridis, subtus pilis albis decumbentibus: thorace obscure punctulato, superne canaliculato ad latera pubescente: scutello triangulari lævi: tibiis anticis distincte bidentatis, dentibus piceo-rubris.

Long. corp. 4 lin.

Obs. In this species the head is slightly convex, thickly punctured anteriorly, and has an indistinct transverse groove on the posterior part, which is smooth; the thorax is almost impunctate; the dorsal channel is narrow and distinct, the lateral foveæ are large; the basal joint of the anterior tarsus is armed beneath with two spines, one at the apex and the other near the middle. The terminal segment of the abdomen approaches somewhat to the form of an equilateral triangle; the central part is without the longitudinal groove observable in *D. Hopei*, but in its place there is a broad, flat portion, which is thickly punctured, and furnished very sparingly with decumbent hairs; the remainder of this segment is impunctate, without hair, and has a fovea towards each of the anterior angles.

In the male the clypeus is not very deeply emarginate; the thorax is glossy, and distinctly punctured; the apical segment of the abdomen flat, and furnished throughout with decumbent white hairs; the anterior tibiæ are bidentate externally, and furnished with a distinct tooth internally at the apex; these processes are of a pitchy-red colour: the hinder tibiæ are furnished with a spinous process which springs from the outer part and curves inwards and upwards.

The specimens from which the description was originally drawn were females, and were lent me by the Rev. F. W. Hope. Since the reading of the paper I have examined many specimens of both sexes, and compared them with the original specimen described by Mr. MacLeay in the work above mentioned.

Sp. 7. D. PULCHELLA (*Kir. MSS.*).

D. viridis: thorace punctato, dorso canaliculato; foveis lateralibus magnis et profunde impressis: scutello foveâ profunde excavatâ: elytris confluenter punctatis: tibiis anticis bidentatis.

Long. corp. 3½ lin.

Obs. From either of the foregoing this species may be known by its great glossiness, smaller size, the straight lateral margins of the elytra, and more narrowed thorax. The anterior part of the head is very thickly and finely punctured; the posterior portion is glossy and distinctly punctured. Thorax glossy, distinctly punctured, the dorsal channel rather broad and deep; the anterior angles acute; lateral margins armed with a tooth or angular projection; the lateral foveæ are large and rather deep; the scutellum is impunctate and has a distinct fovea; elytra thickly and rather coarsely punctured. Body beneath sparingly furnished with white decumbent hairs; anterior tibiæ bidentate externally.

In the collections of the Entomological Society and British Museum.

Sp. 8. D. PILISTRIATA.

D. viridis, nitida; subtus pilis albis decumbentibus tecta, supra pilis albis ornata striis longitudinalibus supra elytra depositis: thorace canali lato dorsali impresso, foveisque 2 lateralibus, sparsim punctato: scutello lævi: pedibus testaceis: tibiis anticis bidentatis.

Long. corp. 3¼ lin.

Obs. The character from which I have named this species (viz. the elytra being furnished with pubescence arranged in longitudinal striæ), and the red colour of the legs, at once distinguish it from either of the others. The clypeus of the male is not very deeply emarginate; the lateral processes are wide apart and diverging; the head is thickly punctured and transversly indented posteriorly. The thorax is coarsely punctured, but the punctures are not thickly disposed; the dorsal channel is broad and shallow; the two foveæ, which in most of the foregoing species is confined to the lateral margins of the thorax, are in this extended from thence to the dorsal channel, and form a transverse indentation, which becomes deeper and broader as it approaches the margins, which are toothed. Scutellum short; anterior tibiæ distinctly bidentate externally; the inner tooth acute; the outer one (which forms the apex of the tibia) is recurved.

I have examined four specimens of this species; they are in the collections of the Rev. F. W. Hope, Mr. Spence, and the Entomological Society. I have also one in my own cabinet, which was given me by Sir Patrick Walker, who informs me there are specimens in some of the collections in Edinburgh.

Sp. 9. D. CASTANOPTERA.

D. viridis, pubescens: thorace canali lato dorsali, foveisque 2 lateralibus impresso; elytris pallidè castaneis, subseriatim punctatis: tibiis anticis bidentatis.

Long. corp. 3¼ lin.

Obs. In this species the clypeus of the male is not deeply emarginate; the head is rugosely punctured anteriorly, less so posteriorly; thorax distinctly punctured, the punctures confluent in the dorsal channel, which is shallow and very broad; the lateral foveæ are very large and shallow, and occupy nearly the whole portion of the thorax from the dorsal channel to the lateral margins, which are distinctly toothed; anterior tibiæ bidentate externally: these processes are very distinct, and in their form and position nearly resemble *D. pilistriata.*

Sp. 10. D. AURULENTA (*Kir. MSS.*).

Colaspidoides? Schön. Synon. Insect. i. p. 101.

D. cuprea, nitidissima, supra pilis albis ornata, subtus viridis, pilis albis decumbentibus: capite dense et crasse punctato: thorace crasse sed sparse punctato sulco transverso profundo; canali dorsali in partes duas, thoracis basin versus, diviso; marginibus lateralibus distinctè dentatis: elytris crasse punctatis: scutello æneo, lævi: pedibus viridibus; tarsis cyaneis, tibiis anticis bidentatis.

Long. corp. 4 lin.

This species may be distinguished from all the foregoing by its rich copper-like colour, and the following characters: The head not very deeply emarginate in the male; thorax sparingly but coarsely punctured, divided by an irregular transverse indentation; the dorsal channel is deep, and gradually increases in width from the apex to the base, leaving a longitudinal elevated smooth surface in the centre; the basal portion of the dorsal channel forming, as it were, two oblong foveæ, which are thickly and finely punctured; the lateral margins of the thorax are dilated in the middle, so as to form an obtuse tooth on each side. Elytra coarsely punctured, the punctures confluent; the anterior tibiæ as in *D. splendens*; the inner portion of the (bifid) claws very thick.

The Rev. F. W. Hope, the Rev. W. Kirby, and Mr. Wm. Spence have each lent me specimens of this beautiful species for examination. There is a slight variation of the colour in different specimens, some being of a brassy green, and others more inclined to copper. There are also specimens in the collection of J. G. Children, Esq., which I have since examined.

Sp. 11. D. PARVULA.

D. viridi-ænea vel cuprea, supra et subtus pilis albis decumbentibus sparse tecta: capite punctato: thorace punctis magnis notato, foveis 2 longitudinalibus parallelis submediis basin versus, marginibus lateralibus subdentatis: elytris rugosis: scutello lævi: tibiis anticis inermibus.

Long. corp. 2¼ lin.

D. parvula is much smaller than either of the foregoing. The clypeus in this species is rather narrow, not deeply emarginate; the head is rugosely punctured on the upper surface, with the exception of a small smooth and shining space towards the posterior portion. Thorax coarsely punctured, divided transversely by an indentation, which becomes deep and forms a large fovea near the lateral margin of the thorax: the dorsal channel is scarcely to be traced on the anterior part; posteriorly it is divided, and forms two oblong parallel foveæ, having an elevated space between them; the lateral margins are indistinctly toothed; the anterior tibiæ are simple.

I am indebted to the Rev. F. W. Hope for several specimens of this insect. This gentleman has likewise deposited specimens in the collection of the Entomological Society.

Sp. 12. D. SPENCII.

D. æneo-cuprea vel cuprea, supra et subtus pilis albis decumbentibus sparsim tecta: capite et thorace rugosè punctatis: thorace canaliculato, marginibus lateribus dentatis: scutello apice depresso, subpunctato: elytris subseriatim punctis confluentibus notatis: pedibus viridibus, tarsis cyaneis: tibiis anticis externe bidentatis, dentibus rufescentibus.

Long. corp. 2¼ lin.

This species is about the same size as the last, but its proportions are very different. The head is very large; the thorax is almost as wide as the elytra, and has the anterior angles produced into a tooth-like process; dorsal channel indistinct; the upper surface is uniformly and thickly covered with coarse punctures, which gives a dull appearance to that part; the lateral foveæ are distinct. The scutellum is somewhat heart-shaped, and has the apical portion depressed and minutely punctured.

I have seen but two specimens of this small species: one was purchased from the collection of the late A. H. Haworth, Esq., by the Rev. F. W. Hope; for a loan of the other I am indebted to W. Spence, Esq., after whom I have named it*.

Sp. 13. D. FURCATA, *Guérin, Griff. Cuv. Insecta*, vol. i. p. 483. plate lv. fig. 13.

"Black, with a white band on each side of the thorax. Elytra red with the base and suture yellow."

Never having seen a specimen of this species, the above account (which is from the work quoted) is all I am able to give. From its colouring I should imagine it could scarcely be one of this genus.

Mr. MacLeay, who has lately returned to England, having in a most liberal manner lent me all his specimens of *Diphucephalæ*, I am enabled to add three species which are distinct from those already described. I subjoin them as an appendix, not being able to insert them in their proper places, owing to the former part being already in the printer's hands. In this gentleman's collection I find the following species:—*Diph. sericea, splendens, aurulenta, parvula, Spencii, pulchella, pilistriata,* and the new species I am about to describe.

I may here mention that I have also lately examined numerous specimens of *Diphucephalæ* in the Collections of the Zoological Society and British Museum. The total number of specimens of this genus which have been examined by me amounts nearly to two hundred*.

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* Since writing the above I have examined many specimens, some of which are in the collection of J. G. Children, Esq. The anterior angles of the thorax I find are not produced in the females as in the males.

Sp. 14. D. RUFIPES.

D. viridis, nitida; capite thoraceque punctulatissimis: thorace supra canaliculato: pedibus testaceis: tibiis ~~anticis~~ tarsisque posticis cyaneis; tibiis anticis ad apicem obsoletè bidentatis.

Long. corp. 3 lin.

In Mus. D. MacLeay.

Obs. This species is rather less than *D. pilistriata*: the head is very finely and thickly punctured throughout: the clypeus in the male is but slightly emarginate, and recurved; the thorax is also finely and thickly punctured throughout, and is very convex, glossy, and sparingly covered with indistinct white hairs; the dorsal channel is very narrow but rather deep. The lateral foveæ are small; the elytra are short, punctured, the punctures confluent, and very sparingly covered with white pubescence; the hairs are so short as to appear like dust, or very minute scales, rather than pubescence. The scutellum is of the form of an equilateral triangle, and smooth. The terminal segment of the abdomen is very long in the male, covered with white scale-like hairs, and furnished at the apex with a distinct tuft of hairs. The legs are of a pale reddish yellow colour; the hinder tibiæ (with the exception of a small portion near the femora) and tarsi are black with a green or blue gloss; the terminal joint of each of the anterior tarsi and the claws are pitchy black; the anterior tarsi are bidentate externally; the hinder tarsi are very long.

There is a specimen in the collection of the Zoological Society which agrees exactly with this species, excepting that the hinder tibiæ are tipped only with black; and as this specimen is a female, and those from which the above description was taken were males, the black hinder tibiæ may be only a sexual character, or else it may be a character liable to variation in both sexes, a point which can only be determined by the examination of a number of specimens.

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* Some of the species described in this monograph may probably be the same as those noticed by M. le Docteur Boisduval, in his "Faune Entomologique de L'Océanie;" but in the very loose descriptions there given the characters which I have found essential to identify the species, are entirely overlooked; indeed these descriptions (where the size is not even mentioned) will do equally well in most cases for almost any one of the genus. M. Boisduval says, at the end of the descriptions, "Il est même probable que parmi celles que je viens de décrire, il y en a plusieurs qui ne sont que des variétés." I must say I never examined a group of insects in which good specific characters were so readily found.

I very much question whether a synopsis of *undescribed* species of insects is desirable, for the characters of these animals are seldom of such a nature as to admit of their being expressed in few words; species, then, which have been only briefly noticed, must be re-described, and the person who takes upon him this task, in order to avoid the introduction of synonyms, of course must consult these brief notices; here perhaps he finds that those characters, by which alone the species can be identified, are overlooked; he must therefore give a new set of names to insects already named, unless he has an opportunity of seeing the original specimens noticed in the synopsis, a thing which perhaps he is not able to do.

Sp. 15. D. PUSILLA.

D. viridis, pilis albis decumbentibus: capite punctatissimo; thorace punctato, canali lato dorsali, foveisque duabus lateralibus: tibiis anticis bidentatis; tarsis cyaneis.

Long. corp. 2¼ lin.

In Mus. D. MacLeay.

Descrip. The head is punctured throughout; the thorax is narrow, and has the lateral margins produced in the middle, and forming an angle. The dorsal channel is very broad and distinct; the lateral foveæ are very large, deep towards the lateral margins of the thorax, and extend to the dorsal channel. The thorax is distinctly punctured; the punctures are most thickly disposed in the dorsal channel and lateral foveæ. The elytra are coarsely punctured; the punctures confluent: the two elevated ridges on the disc of each elytron are distinct; the terminal segment of the abdomen is convex, thickly punctured throughout, and covered with white pubescence.

Obs. I have seen only one specimen of *D. pusilla*, and this is a male; it differs however in so many respects from its allies *D. parvula* and *D. Spencii*, that I have no hesitation in describing it as a distinct species. Upon comparing the three together we at once perceive a considerable difference in the form, owing to the elytra being longer and larger in proportion, and less convex, and the thorax being narrower in *D. pusilla* than either of the other two species. In *D. pusilla* the clypeus is nearly in the same plane with the fore part of the head, whereas in *D. Spencii* this part is considerably recurved, and rather more deeply emarginate. In *D. parvula* the clypeus is slightly recurved, and narrower than either of the other two. The thorax of *D. pusilla* has a simple shallow dorsal channel, whereas this part is divided by an elevated ridge in *D. parvula*; the lateral foveæ are larger and deeper in *D. pusilla* than in *D. Spencii*, and are connected by a shallow transverse impression with the dorsal channel; the thorax is more finely punctured in our present species than either of the other two; the punctures are less thickly disposed and uniform than in *D. Spencii*. The anterior tarsi are longer and less dilated in this species than in the two with which we are comparing it.

There are many other minor points of distinction, but enough has been said to render it easy to identify the species. The only specimen I have seen being a male, I have, of course, compared with it the males of others only.

Sp. 16. D. PYGMÆA.

D. viridis, pilis albis decumbentibus: tibiis anticis bidentatis: capite thoraceque punctulatissimis: scutello triangulari, foveâ excavato, punctulatissimo; tarsis cyaneis.

Long. corp. 2 lin.

In Mus. D. MacLeay,

This is the smallest species of *Diphucephala* I have examined, being less than either *D. Spencii* or *D. parvula*: it is of a rich green colour, but not glossy. In the male the clypeus is rather narrow, and recurved, not very deeply emarginate: the head and thorax are shagreened, exhibiting, under a strong lens, very delicate punctures; the latter (which is rather broad) has a shallow dorsal channel, which is divided posteriorly by an indistinct elevated ridge; the lateral foveæ are large, and tolerably deep; the thorax in the female is more distinctly, although very finely, punctured. The scutellum has a large impressed fovea towards the posterior part, which is very finely punctured. The sculpturing of the elytra is more delicate than in the allied species *D. Spencii* and *D. parvula*; the two usual elevated longitudinal striæ on the disc of each elytron are tolerably distinct. The anterior tibiæ are bidentate; the tooth-like processes are of a pitchy red colour, and so are likewise the claws. The whole of the upper surface is furnished with white or yellowish decumbent hairs, which are rather thickly disposed.

The specimens examined are from New Holland.

DESCRIPTION OF THE FIGURES.

PLATE XXII.

Fig. 1. *Diphucephala sericea.*
- *a a*, Mandibles of do.
- *b*, Maxilla.
- *c*, Labrum.
- *d*, Mentum.
- *e*, Antenna.
- *f*, Hind leg.
- *g*, Anterior tarsus and apex of tibiæ.

2. Anterior tibia of *Diphucephala Hopei.*
3. Do. do. of *D. splendens.*
4. Claws of anterior tarsus of female, *D. Hopei.*
5. Do. do. of male.
6. Anterior tibia of *D. pilistriata.*

XLV. *On the Predaceous Habits of the Common Wasp,* Vespa vulgaris, *Linn. By* G. Newport, *Esq.*

[Read 7th December, 1835.]

Every naturalist is acquainted with the predaceous habits of the common wasp, and the devastation it commits among Dipterous, Hymenopterous, and Lepidopterous insects, but I am not aware that any particular account has been given of the manner in which it commits these devastations. Dr. Darwin has somewhere made a statement respecting the wasp, which he seems to think affords a strong proof of a faculty of reasoning in insects; but I think it will appear that the fact he observed, and upon which he founded his opinion, was only one of those occurrences which form part of the instinctive predaceous habits of the species. Dr. Darwin's account, as nearly as I can remember, is, "that happening one day to see a wasp kill a fly, he watched its motions, and saw it cut off the head and abdomen, and then attempt to fly away with the remainder; but the wind being strong, the flight of the wasp with its prey was impeded; and that the wasp then alighted again on the ground, and cut off the wing, and then flew away with the remaining portion." This statement, upon a *primâ facie* view, certainly looks very like a process of reasoning on the part of the wasp, but it appears to be only its usual habit upon every similar occasion. In September, 1834, I had an opportunity of observing the predaceous habits of the wasp in a large garden in which there was a very numerous colony. I was capturing insects upon a small plot of ground overgrown with thistles, which were then in flower. The common white butterflies *Pontia napi* and *P. rapæ* were exceedingly abundant, and the wasps, and many Dipterous insects, were flying about very actively, when I observed, on a sudden, a specimen of *P. rapæ*, towards which I was then looking, precipitated to the ground from the thistle-blossom upon which it had been very quietly seated; and upon going up to it immediately, I found a wasp very busily employed in cutting off its wings and head, and afterwards its legs. When it had done this it took up the dismembered body, and poising it between its own legs, flew away with it to a neighbouring tree, where, upon following it, I found it mangling the body of its prey, as if to destroy the little remaining vitality. While doing this the wasp had suspended himself upon a leaf by the claw of one leg, which supported its whole weight, while its other limbs were employed in holding and turning the mangled body of the butterfly. When it had done this sufficiently the wasp rolled up the body between its second and third pairs of legs, and poising itself upon its wings, flew away towards its nest. During the same morning I had several opportunities of watching the proceedings of the wasps, and found that their mode of capturing and subsequent treatment of the prey were always the same. They cut off the wings, legs, and head immediately they had struck their victims to the ground, and then carried off the body to a neighbouring tree or resting place to mangle it still further, before they took their final departure for the nest. This proceeding generally takes place in the middle of the day, while the sun is shining brightly, and the butterflies are intoxicating themselves with the sweets of the thistle-heads. It is then that the wasp is most active, flying round with great swiftness from thistle to thistle, and pouncing down upon the luckless butterflies like a falcon on his prey. The butterflies, which appear to be aware of the common enemy, sometimes avoid it by dropping aside or taking flight at the very instant of its attack. The wasp attacks Dipterous insects in a similar manner, by pouncing upon them, but I have not observed it strike them to the ground as in the case of the butterflies. I saw a wasp capture a species of *Eristalis*; it cut off the head, limbs and wings, as of the butterfly, but devoured the abdomen on the spot, and then flew away with the trunk. Its chief prey among Lepidopterous insects is *P. rapæ*, although it attacks all the other species of white butterflies. I saw it attempt to capture the fine species *Vanessa Atalanta*, but the insect was too nimble for it. If it misses its object it does not make a second attack, but flies on to the next thistle.

From these facts I am induced to believe that Dr. Darwin's opinion respecting the existence of a reasoning power in insects, as deduced from the fact he observed, was too hastily formed, and that, instead of its proving this, it shows us that insects have an unerring instinct, very similar to, but perfectly distinct from reason, and that this instinct prompts them always to act in the same manner.

XLVI. *Description of a new Hemipterous Insect from the Atlantic Ocean. By* Robert Templeton, *Esq., R.A., &c.*

[Read Sept. 7, 1835.]

Hydrometridæ, *Leach.*
Genus Gerris, *Latr.*
Subgenus Halobates, *Eschscholtz, Entomographien.*
Sp. *H. Streatfieldana.* Plate XXII. fig. A.

Broadly ovate or lozenge-shaped, brilliant black; eyes, two minute spots near the prothorax, and the sides and apices of the first uncovered pair of abdominal annuli (4th and 5th) rufous; beneath brownish black, the first five abdominal rings yellowish with rufous apices, offering the appearance of five narrow transverse fasciæ; last rings broad and rufous black. Apterous.

Length 0·13 inch.

Found on the Atlantic Ocean in longitude 20° under the line.

This beautiful species was captured nearly midway between the continents of Africa and America by Col. Streatfield, 87th R. T. F., whose name I have in consequence done myself the favour to affix to it, as being most appropriate, and as a slight testimony of the grateful recollection I have of his kindness in presenting me with many interesting species of insects and other rarities. The sea was quite smooth, with a gentle swell, at the time the insect was caught; a number were seen swimming about among the *Porpitæ*, which formed the first object of attraction, and fortunately directed attention to the insect. The singularity of its distance from any land, and the possibility of its being driven off from the African coast by the south-eastern gales, gave full play to conjecture and excited our attention to the little creatures in the water, in the hope of ascertaining on what objects it preyed; but all possibility of discovering this was quickly put a period to by the S. E. trade sweeping over the surface and banishing all traces of the *Medusæ* and their companions.

This species obviously belongs to a section or subgenus distinct from that in which our linear European species are placed, and characterized by the contracted dimensions of the body, and the dilatation of the head and prothorax, and the shortness of the latter. When examined minutely we find the whole body covered with minute hairs, those on the legs predominating beneath, the upper curving downwards. The head is somewhat triangular with two cupped processes laterally within which lie the bases of the antennæ; two small rufous maculæ are on the sides of the middle line closely adjoining the prothorax. The eyes are large, rufous, semiglobular, and occupy the space between the base of the head and the processes of the antennæ, emarginating the corselet laterally. The antennæ are about ⅓ the entire length of the body; the 1st joint slender and curved outwards, the last thickest, attenuating towards the tip.

The prothorax is excessively short, collar-like, and gently channelled above into three subequal divisions, which nearly disappear in the dried specimen. The first pair of legs, arising closely to the mesothorax beneath, are moderately long, rather robust; the coxa short, obconic, and curved; the femur slightly *f*-shaped, with 4 or 5 strong black spines near its base exteriorly; tibia basally attenuated, arising with a curve from the preceding joint, and with 4 or 5 strong black spines inferiorly, apically giving origin to a strong obtuse process, which projects backwards and outwards from near the articulation. Tarsus with the two joints subequal, the last diminishing in diameter beyond its middle, after giving attachment to two strong claws and an anomalous horny process on the under side, and also furnished with two long curved spines arising from the back part on each side, and lying adpressed among the hairs.

The metathorax and mesothorax seem confounded together, presenting superiorly a hexagonal figure, a little longer than broad, the anterior side being carried a little forwards, so as to leave the lateral angles behind the centre. The posterior surface is transversely striate from being impressed upon the abdominal rings. The sides in the dried specimen become somewhat hoary from the light thrown back by the minute hairs. Beneath it is somewhat similar in form, but excavated behind, exposing in the sinus the abdominal rings. The sides posteriorly are rugose, with trochantines, from whence proceed directly backwards the coxæ of the last 4 legs, that of the posterior pair lying beneath the other on each side. The legs are slender, the middle pair exceeding the first, and the last pair the middle, by about one third. The last also has the apical half of the tibia, and 1st joint of the tarsus, with a row of long hairs beneath. Above the origins of the legs we find rudimentary processes, which, as the insect is apterous, must be looked upon as those of the undeveloped wing.

Fig. A. Represents the insect magnified.
A. 2. Right antenna.
A. 3. Sketch in profile of the body to show the origins of the legs.
A. 4. The right fore leg.
A. 5. The last tarsal joint, exhibiting the claws.

XLVII. *Case of Maternal Attendance on the Larva by an Insect of the Tribe of* Terebrantia, *belonging to the Genus* Perga, *observed at Hobarton, Tasmania. By* R. H. LEWIS, *Esq., M.E.S., in a Letter addressed to the* SECRETARY.

[Read Dec. 7, 1835.]

THE maternal solicitude of insects for their offspring has been seldom observed to extend beyond the various contrivances which instinct directs them to make at the time of the deposition of the egg, the female insect dying in most cases immediately after. In social Bees and Ants the parental duties to the larvæ are performed by a particular portion of the community allotted for that purpose. The cases of the Earwig, first, I believe, observed by De Geer, and subsequently said to have been confirmed by Mr. Rennie in the Penny Magazine, and a doubtful one of *Acanthosoma grisea* mentioned by Kirby, are the only instances I can call to mind resembling the present. On the 4th April, 1835, I first had the pleasure of observing, in the Government domain on the banks of the Derwent, this most decided case of parental attendance in a tribe of insects where I least expected to find it, the *Terebrantia*. I have not been able to detect the male insects, they probably having all died before I arrived, but, judging from the females, it would seem to belong to the genus *Perga*, of which it is probably a new species; but I am now rearing a brood, and when I am in possession of the other sex I will not fail to transmit a full description of its characters. A description of the female will be found appended, from which you will perhaps be enabled to pronounce its true situation; but at this distance from collections and works of reference I can give little better than conjectures. The female insect deposits her eggs in a longitudinal incision between the two surfaces of the leaves of one of the gum trees (*Eucalyptus*), adjoining the midrib. Though it is but one chamber, I imagine it to be formed by numerous punctures in successively depositing the eggs, traces of such being visible along the midrib. The eggs are placed transversely in a double series, and are in number about eighty, but this is subject to considerable fluctuation. They are of a pale yellow colour, and of an oblong form, two lines in length and half a line in breadth. On this leaf the mother sits till the exclusion of the larvæ, which appear not to remain in the ova state many days; nor can she be made to leave the spot except by actual force, when her flexible tarsi enable her to cling pretty firmly, some of the articulations being wrapped round the other side of the leaf. I at first imagined that she might facilitate their exclusion by gnawing a passage for them through the epidermis of the leaves; but, from the apertures (of which there are but two or three) being circular, and but just sufficient to allow of the egress of the larvæ, it seems more probable that they are made by them, as her large mandibles are by no means fitted for such delicate workmanship. The larvæ, when hatched, are of a dirty green colour, with shining black heads; they keep together in the brood, arranging themselves in oval masses, their heads pointing outwards; but sometimes I have seen them arranged on both sides of the leaves, their heads pointing towards the edges. The former is their attitude when not eating, which they appear to do at night; at least I never observed them very actively engaged in the daytime. The mother insect follows them, sitting with outstretched legs over her brood, preserving them from the heat of the sun, and protecting them from the attacks of parasites and other enemies with admirable perseverance. I endeavoured to drive some from their posts by pricking them with the point of a black-lead pencil; but they refused to leave, seizing whatever was presented to them in their mandibles, no doubt very formidable weapons when employed against their own race. They never offered to use their wings or move from the spot. In one instance a nest of eggs and group of larvæ being on two nearly contiguous leaves, the mother of the former had deserted hers for the latter, two being found attending on that group, the one partially clinging on the back of the other, which showed no disposition of resenting it. In another instance two were found attending on one nest of eggs: the nest being rather large I at first thought they might each have had a share in its construction, but a group of larvæ a little distance off being without any guard, it seemed to be another case of desertion. I put one of them on the leaf which had the larvæ, when she seemed much discomposed at first, but in a little time stretched herself over the group as though her own, which indeed it might have been. But to put to a certain test whether they were capable of distinguishing, or led by any particular care for their individual progeny, on the 15th April I transposed two specimens, so distinct that I should know them again. When first placed on each other's nests they seemed somewhat uneasy, as was to be expected from handling them, but on examining them the next day they appeared perfectly reconciled to the change. They continue resting on these leaves until death puts a termination to their labours, a period of from four to six weeks, and the principal object of their care seems to be the preservation of the brood from enemies, as I never observed them give any direct assistance to the larvæ, either in their exclusion from the nest or in their feeding, and those broods which had been deprived accidentally of their mothers being still in a thriving state. The larvæ, at least those which were without mothers, when sleeping, preparatory to casting their skins, arrange themselves in an oval mass, their heads pointing outwards, and with the anterior legs elevated, resting on the four posterior only; the remainder of the body is likewise thrown upwards, and their tails meet in the centre, forming a conical mass, which may not inaptly be compared to the high crust of a pie: concealed in the centre of this mass are the small and feeble individuals of the brood. Frequently, however, they arrange themselves round a twig. You will bear in mind that the preceding observations were not made in a study, where confinement and other circumstances might be supposed to influence their habits, but in the open air, on their native trees. The larva not having arrived at full growth it is useless describing it. The following is a short description of the female insect: Head large, quadrate, nearly equalling the thorax in breadth. Antennæ clavate, not longer than the head: first joint subglobular; second shortest; third, fourth, and fifth cylindric, and of equal length; sixth large, elongate, ovate, and longer than the three preceding joints taken together. Wings with one marginal cell, sending forth a nervure to the apex of the wing; submarginal cells four, the division between the first and second frequently obsolete. Stigma large. Four posterior tibiæ near their middle furnished with a spine. ♀ above dark ochreous; the head and mesothorax above with a fuscous line on each side, beneath luteous. Posterior legs, with the apex of the tibiæ, the apex of the first joint and nearly the whole of the subsequent joints of the tarsi black. Eyes and ocelli black. Length 8 lin.

P.S.—As the insect described by Mr. Lewis differs from any of the species of Perga recorded by Dr. Leach in the Zoological Miscellany, vol. iii., it may be appropriately named and characterized thus:

PERGA *Lewisii* supra ochracea, capitis thoracisque lineâ laterali apiceque tibiarum et articulorum tarsalium posticorum nigris.

Long. corp. 8 lin.

Habitat in Australasia. In Mus. nostr.

J. O. W.

XLVIII. *Anatomical Observations upon the Larva of* Calosoma sycophanta. *By Dr.* HERMANN BURMEISTER, *Fellow of the Natural History Society of Berlin, For. M.E.S., &c.*

[Read Oct. 5, 1835.]

THE first author who has given a description of the larva of *Calosoma sycophanta* was Réaumur (Mémoire, &c., vol. ii. p. 457),—whose account has been republished by many subsequent authors. I have often had occasion to observe this insect, which is not rare in the pine-woods in the neighbourhood of Berlin in the larva as well as in the perfect state, in both of which I have seen it employed in devouring the larvæ of *Liparis dispar* and other moths, which are very common in the vicinity of this capital.

The length of the animal is one inch and a quarter; the colour black on the upper side, but on the under side white, with black spots. The skin of the upper side is corneous, but on the under membranous, and the spots alone corneous. Nine of these corneous spots are placed on each segment, in the manner and being of the relative size represented in the figure. Between the two exterior a small spiracle is to be observed. The whole body is composed of thirteen segments: the first segment is the head, upon which are affixed the antennæ, trophi, and six eyes on each side behind the latter organs. The antennæ have four joints, of unequal size; the first being the shortest and thickest, the remainder of equal length, but gradually smaller (fig. 13. *a*, *a*.). The mandibles (fig. 2. fig. 13. *b*, *b*.) have a large tooth in the middle. The maxillæ consist of a small basal joint (fig. 4.), and a second larger, bearing two articulated appendages; the exterior three-jointed, which forms the maxillary palpus, and the interior two-jointed, forming the interior maxillary palpus, or the *galea* of *Orthoptera*. The underlip is a small coriaceous piece (fig. 5. fig. 13. *d*.), bearing two two-jointed palpi, and closing the mouth from beneath. The three following segments after the head form the thorax and bear the legs. The first is larger than the others and has a small longitudinal impression in the middle; the two following are respectively equal in size with the remaining segments, the last only excepted, which is evidently smaller. The legs are composed of five joints, gradually decreasing in size; of these the first large and thick joint is the coxa, the second the trochanter, the third the thigh, the fourth the tibia, the fifth the inarticulated tarsus, armed at the extremity with two equal claws. On each side of the body and between all the segments a spiracle is to be perceived, but between the second and third and the two last I have not found these organs. Therefore on each side of the body there exist only nine spiracles, which are indicated as black spots in the ninth figure. The last conical joint bears the anus at the extremity, over which are two long spines, which on the under side are armed with a small tooth (fig. 12.).

For making the following anatomical disquisition I opened the larva on the left side along its whole length, turning the upper part over on the right side, as represented in fig. 9, whereby the internal organs become conspicuous. By this means two large longitudinal muscles on the back are perceived, which arise from the head and terminate at the anus. Between them is an open space, in which is placed the longitudinal dorsal vessel, or the heart, affixed with its wing-muscles on each side of the skin. On observing this part with the microscope I have found the same structure which Straus-Durckheim has described in his account of the heart of *Melolontha vulgaris*; but the wing-muscles were finer, and covered with minute grains, which I presume may be grains of fat. The openings in the vessel which this lynx-eyed author has detected, and of which he has given a very elaborate description, I have also very distinctly observed in this larva, namely, the valves which close the openings from the internal side, and also in front of each opening the aperture in the lateral wing-muscle of the heart. In that part of the vessel which lies in the first three segments of the body, the wing-muscles and the openings are wanting; I have also observed this part of the dorsal vessel very intimately fixed upon the intestine, and attending it to the brain, under which it passes with the œsophagus.

The intestines when extended are double the length of the body, but in the natural position (fig. 11.) they are of the same length with it. A short œsophagus (fig. 12. A.) arises at the mouth, and goes into the first segment, at the end of which it is amplified into the stomach (fig. 10 and 11. A.), which occupies the greatest space in the cavity of the body. This stomach is of an equal width, and is formed of two fine membranes; it is covered with the fat, into which many tracheæ are extended. This largest part (which may be called the craw) is succeeded by the second part of the stomach, smaller than the former but of the same length (fig. 10. B.), with thicker membranes, and very conspicuous transverse folds. At its extremity we observe a constriction before which four fine vessels, termed bilious vessels, or, from their first discoverer, vessels of Malpighi, *vasa Malpighiana*, pass into the stomach. Both parts of the stomach, the first or craw (A) and the second (B), are continuous,

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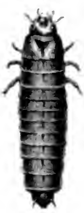

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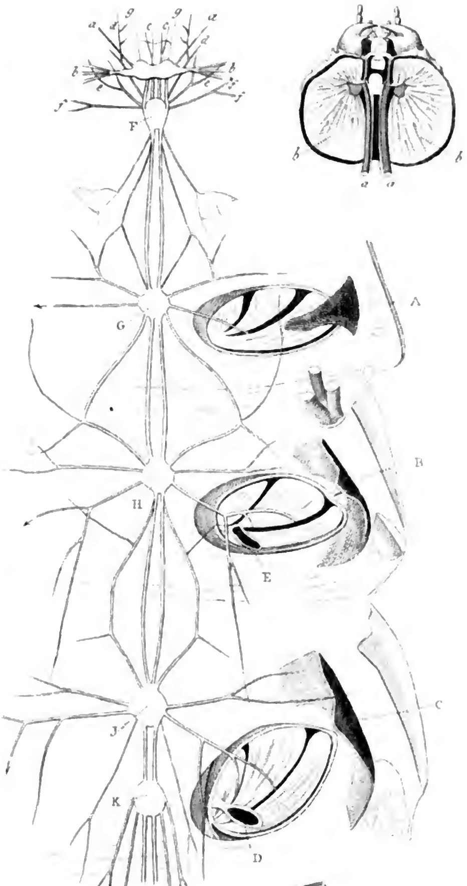

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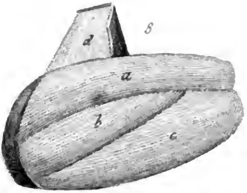

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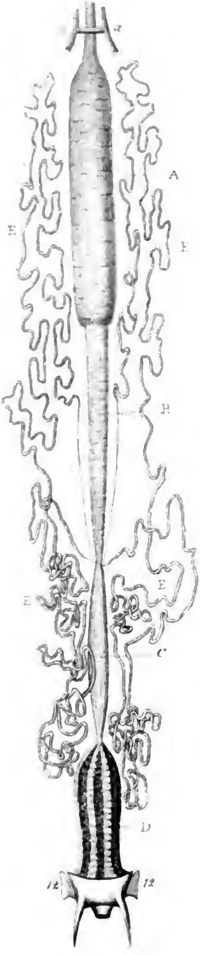
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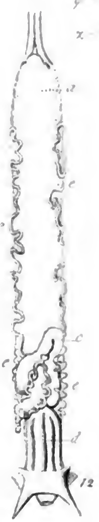
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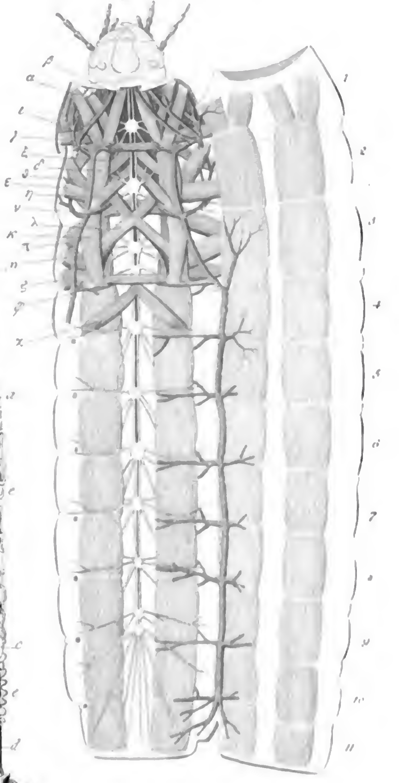
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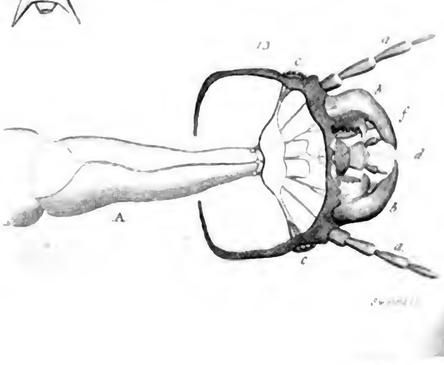
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and we find no valves separating them: this circumstance is very curious, because at the same place in the perfect state of the insect we observe another little stomach, covered on the internal side with teeth, and used for masticating the food, of which also we see no trace in the larva. The second part of the stomach, as well as the ileum, makes a great winding in the natural state, so that we could not see the second stomach in this state, but only the latter (fig. 11. C.) The ileum (fig. 10. C.) is a short part pointed towards both ends and smaller than the stomach. It contains a white matter of calcareous appearance, which also fills the rectum (fig. 10, 11. D.) This part has a very minute opening, but is subsequently dilated, and constricted towards the end. It consists, as does also the whole intestine, of two membranes, namely, an internal slimy tunic (*tunica mucosa*), and an external muscular tunic (*tunica muscularis*), which forms the transverse folds upon the second stomach and the rectum, upon the latter of which four large longitudinal folds are internally to be observed, three of which are represented in the figure, and which are the cause of the curious form of the excrement in many other larvæ. The anus appears as a small cone at the end of the body (fig. 10, and fig. 12.).

The bilious vessels (fig. 10. E, E.) pass into the intestine at one place on the under side, and not, as Ramdohr says, around the circumference. From this source they ascend towards the œsophagus, and are laid upon the stomach (fig. 12, E, E.) Having reached the front part of the stomach, they are turned backwards to the hind end, pass the place of their insertion, and attend the windings of the ileum, between which they make many copious folds, and return to their first source in the stomach, as represented in fig. 10.

The respiratory system is formed of a long trachea placed on each side of the body (fig. 9.), which receives the air which passes through the spiracles by the addition of small lateral branches. At the same place two other branches arise from the longitudinal vessel, one of which ascends to the back, and the other descends to the inferior portion of the body; many smaller branches extend to all the internal organs. At the hind end the longitudinal trachea is extended into numerous small branches. In the third thoracic segment this vessel has two great arms, of which the superior goes to the back side, the other passes along the chamber of the thorax, and emits a small branch towards the belly, in the lower portion of the body (see fig. 9.): the larger branch goes through the thorax towards the head, emitting various minor filaments which lie upon the muscles of the thorax and the other organs, and is united with the branch of the first spiracle. From this spiracle arise therefore five branches, two going to the head, one for the muscles on the superior and inferior part of the body, the fourth is the connecting vessel with the longitudinal trachea, the fifth, which is cut off on each side in my drawing, goes to the stomach, and attends it with many small and large branches to the beginning of the abdomen. The four tracheæ also which go into the head, attend the œsophagus, namely, two on the superior, and two on the inferior side. The superior arms are connected together by a transverse branch on arriving at the head (fig. 10, *a*, *a*.), their front parts emitting many little branches, which go to the brain and the muscles in the superior parts of the head: the two inferior arms are not connected; they attend the nervous system (fig. 6, *a*, *a*.) and go to the maxillæ and the labium in many little branches.

With respect to the muscular system, I have already described the muscles of the back, but the muscles of the belly side are now to be noticed. In the hind part of the body the same construction is observed, namely, two long muscles, which arise at the anus and go to the head, affixed to the membrane between two segments of the body, as represented in my drawing; but in the three first segments the muscles are very numerous, as I will now describe, from the head towards the abdomen. In the first segment we find the muscles for the head and the first feet. The muscles which move the head are continued from the great longitudinal muscles above mentioned. To this end each longitudinal muscle is divided into two arms, one external going to the margin of the first segment (α), the other internal going to the margin of the head (β). The external arm of the belly-muscles has at its base a small muscle which goes to the external margin of the segment (γ). The muscles of the feet are in all three segments alike, and may therefore be described at once. I must therefore observe that from the internal layer of the skin at the outside of the feet there arises a corneous lamella (fig. 7, A, B, C.), from which one muscle (fig. 8, *d*.) goes to the hind margin of the foot, moving the leg backwards. Three other small muscles (fig. 8, *a*, *b*, *c*.) arise from the fore and internal margin of the foot, and go to the outside of the back segment, covering each other (fig. 8, *a*, *b*, *c*.). These muscles move the leg during walking.

Between the first and the second a little corneous lamella exists, (fig. 7, D, E.) which separates them from each other, but is not connected with either of them. The whole apparatus is smaller in the anterior leg, and largest in the four posterior legs, as my drawing (fig. 7.) will show from the size of the lateral corneous lamellæ, from which arise the first-named muscles. In the internal space of the leg we see three muscles, which go from one joint of the leg to the next, and move the several joints. Between these muscles nerves (fig. 7.) and tracheæ pass, which come from the great vessel of the stigma. In the second segment of the thorax the muscular system is more complicated. We see in the middle a small longitudinal muscle (δ), from which two small oblique branches (η, η.) go to the middle of the breast. Under this longitudinal muscle may be seen two others, one oblique (θ) and one transverse (ε), which connect the belly-side of the body with the back, as shown in the right side of my drawing (fig. 9.). In the third segment of the thorax the construction is nearly the same, but yet more complicated. The longitudinal muscle is double (κ), one superior, the other inferior; and between them we see at the anterior and posterior part of the segment a large transverse muscle (ν, φ), connecting both together. This same muscle is likewise at the posterior part of the first segment, as represented in the figure at ι. For the connexion of the second and third segments is used a muscular cross, formed of two muscles (λ, λ.), which come from the superior longitudinal muscle on one side, passing to the opposite part of the second segment, on which it is affixed before the foot under the longitudinal muscle. The connexion of the back- and belly-side of the third segment is effected by three muscles, two oblique (π, μ.) and one transversal (ρ), on each side. Lastly, we remark, for the connexion of the first abdominal segment with the thorax, a pair of muscles, which arise from the longitudinal muscle and go towards the middle of the anterior margin, on which they are affixed (χ). All these muscles have their proper tracheæ, which come from the neighbouring great branch, already described, and delineated in fig. 9.

The nervous system is composed of a long double thread, connected together by thirteen ganglions, of which two are placed in the head and the others in the body. The first ganglion lies upon the œsophagus, and is called the brain, or more correctly the great brain, because from it arise branches passing to the organs of sense, namely, the eyes and the antennæ. In fig. 12, we see this brain as a transverse stripe, constricted in the middle, and attenuated on each end into a fine thread, which is divided into six others. These are the nerves for the eyes, which are more distinctly represented in fig. 7, *b*, *b*. From the great brain arise also the nerves for the antennæ, being simple threads, as exhibited in fig. 13, and fig. 7, *a*. *a*. Moreover, from the anterior side of the brain two nerves (fig. 7, *g*, *g*.) arise, which are furcate, and which go with the external branch to the muscles in the forehead, with the internal to a little ganglion which lies upon the œsophagus, as seen in fig. 13. From this little ganglion arises a fine nerve, which returns to the brain, passing under it, but not being connected with this organ, since it reaches its hinder side, and attends the œsophagus to the stomach. In front of this organ the nerve forms a little ganglion, which emits two nerves; and behind the brain the same nerve is divided into two branches from two little ganglions, which are also connected with the brain, and lie on the external side of the œsophagus. The second ganglion of the head (fig. 7. F.), which I have named the little brain (in my 'Manual of Entomology,' vol. i. p. 297.), lies under the œsophagus, upon a corneous fork, which I have figured in fig. 4, A., between the great muscles of the mandibles (fig. 6. *b*, *b*.) With the great brain it is connected by two thick nerves, embracing the œsophagus. From this little brain arise eight nerves, four on each side, the external one going to the mandibles (fig. 7. *f*, *f*.), the two following to the maxillæ (fig. 7, *e*, *d*.): the centre ones are the nerves of the labium (fig. 7, *c*, *c*.) From the hind end arise six nerves; two thick ones going to the first ganglion of the body, the two external making a little system of nerves for the muscles in the prothorax, and the other two making a connecting system with the first abdominal ganglion, from which go other small nerves to the muscles and internal organs. The first ganglion of the body (G,) lies in the first segment, which is afterwards the prothorax. From this ganglion arise the connecting threads with the preceding and following ganglion, and three other nerves; the first of which goes to the muscles in the segment, the middle one to the leg, and the hind one forms another connecting nerve, which has a little ganglion, and from this various small nerves are emitted to the muscles. The second ganglion of the body (H,) has the same structure, but the nerves are somewhat larger, and the nerve for the legs has several branches. The third ganglion (I,) has also the same structure, but the hind connecting threads are not connected with the fourth ganglion, which is only connected by the two middle and greater threads. These two ganglions (I, K,) are also the most contiguous of all, except the two last, which touch each other. From the fourth ganglion arise the connecting threads and two little muscular branches. The seven abdominal ganglions possess a similar structure, and send out on each side three nerves, from which one goes on the upper side of the longitudinal muscles, and the two others under that organ; the first of which we may regard as the respiratory nerve, because it goes to the trachea on each side, as is shown in the drawing (fig. 9.): the other four are muscular nerves. The last ganglion alone, which sends out other smaller nerves in the middle, supplies some of them to the rectum and the generative organs, of which I have found no sign in this larva. Regarding the situation of the nervous system, we find it placed at the lower part of the body, and in the central line, being exactly opposed to the dorsal vessel, or the heart. In the three first segments the first and last transverse connecting muscle (fig. 9, ι, ρ,) lies over it, and also the oblique and internal muscles, which form the cross (fig. 9, λ.), and the internal first abdominal muscles (fig. 9, χ.) ; the other parts of the nervous system are free, and only covered by fat and the intestine.

XLIX. *Observations upon the Corn Weevil, contained in a Letter addressed to the Rev.* F. W. Hope, *F.R.S., Pres. E.S., &c.* *By* William Mills, *Esq., F.L.S., &c.*

[Read 2nd November, 1835.]

I spent from the month of January till August this year (1835) in Madeira with my friend Lord Vernon, with whom I went out in his yacht, the Harlequin, and I had an opportunity of observing a good deal upon the Weevil (*Calandra granaria*). What the progress of the annual laying of the egg in common wheat is I am not quite prepared to say, as Shaw declares that the female perforates a grain of wheat and lays its eggs; but I am inclined to differ with him in that; and in regard to Indian corn, I am pretty certain that the animal lays its egg in the blossom, and that the corn is formed with the egg in the heart. I examined very many grains for several days, and most minutely, with a microscope, and could discover no signs of perforation anywhere, although the chrysalis was evidently there in the centre of the grain. I then cut the grain open, took the chrysalis out, but could discover no wound of any nature in the corn itself by which it could have been lodged from without: this happened so continually that it leads me to suppose that it must have been deposited during blossom. I then tried at what heat I could hatch them, and I found 110° Fahrenheit succeeded, whilst from 130° to 140° of heat kills them. A gentleman of the name of Wilkinson, in Maderia, has now established a heated room with hot water pipes, in which he receives as many as 800 bags of wheat at a time; these become heated through at about 135°, and the wheat, when resifted, is perfectly cleansed from these noxious insects, and makes quite as good bread as before. I also tried some of it in the ground that had been subjected to this heat, and it came up. It is very possible I may not have communicated anything very new to you, but which, if such be the case, I am sure you will excuse. An old medical gentleman assured me that he considered the wings and crustaceous parts of the Weevil so heating to the system as to be almost as injurious as cantharides taken internally on a slow scale. And when we consider the quantity of bread which is imbued with them in warm climates, it is decidedly worth attending to for the sake of a purer food. I am aware that weevils, when once brought amongst corn, continue to breed by laying the egg in wheat. But how do they first get there at all? Nature has supplied them with wings, so that the reaching of the blossom for the purpose of laying the egg is perfectly attainable to them. In almost all the instances I have alluded to the insect was in the heart, and the *farina* formed all round it without a wound of any nature. Amongst rice and other grain I believe them to be communicated entirely in store, or in a ship, which amounts to the same thing.

PROSPECTUS

OF

PRIZE ESSAYS

ON THE

SUBJECT OF NOXIOUS INSECTS AND REMEDIES FOR THEIR DESTRUCTION.

It being one of the principal objects of the Entomological Society of London to render their labours practically useful, the Council have resolved to appropriate the annual sum of Five Guineas, or a Gold Medal of the like value, to the Writer of the best Essay (to be drawn up from personal observation) upon the natural history, œconomy, and proceedings of such species of insects as are obnoxious to agricultural productions, to be illustrated by figures of the insects in their different states; together with the result of actual experiments made for the prevention of their attacks or the destruction of the insects themselves.

The subject of the Essays for the year 1835 to be the Turnip-Fly*.

The Essays must be forwarded to the Secretary, (at No. 17, Old Bond Street,) with fictitious signatures, on or before the Fourth Monday in January 1836, when they will be referred to a Committee to decide upon their respective merits, after which, with the permission of the Writers, both the Prize Essay and any others of value will be published.

The Essays must be respectively accompanied by a sealed letter, indorsed with the fictitious signature adopted by each Author, and inclosing the real name of the Writer.

General Meeting,
2nd of June, 1834.

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* "This part of our inquiry" (as to the transformations and early proceedings of the Turnip-fly) "is by far the most important; and, important as it is, cannot, in the present state of information, be fully answered."—*Report of the Committee of the Doncaster Agricultural Association on the Turnip-fly*, 1834, p. 23.

JOURNAL OF PROCEEDINGS.

In pursuance of Resolutions adopted at a preliminary Meeting held on the 3rd of May 1833, at which were present, N. A. Vigors, Esq., M.P.; J. G. Children, J. E. Gray, G. R. Gray, J. F. Stephens and W. Yarrell, Esquires; Revds. F. W. Hope and G. T. Rudd, and Dr. Horsfield, the organization of the Entomological Society was effected; and the First General Meeting was held at the Thatched House Tavern, St. James's Street, on the 22nd of May 1834, J. F. Stephens, Esq. in the Chair, when the Council, consisting of the following Gentlemen, was elected, viz.:

J. G. Children, Esq., Sec. R.S., &c.
A. H. Davis, Esq., F.L.S., &c.
J. E. Gray, Esq., F.R.S., &c.
G. R. Gray, Esq.
A. W. Griesbach, Esq., B.A.
Rev. F. W. Hope, M.A., F.L.S., &c.
Dr. Horsfield, F.R.S., &c.
E. Newman, Esq., F.L.S., &c.
J. F. Stephens, Esq., F.L.S., &c.
Lieut. Col. Sykes, F.L.S., &c.
N. A. Vigors, Esq., M.P., D.C.L., F.R.S., &c.
G. R. Waterhouse, Esq.
W. Yarrell, Esq., F.L.S., &c.

And the various officers of the Society were appointed as follows:

Honorary President	Rev. William Kirby, M.A.
President	J. G. Children, Esq.
Vice-Presidents	N. A. Vigors, Esq., M.P. Dr. Horsfield. J. F. Stephens, Esq.
Treasurer (and Vice-President)	Rev. F. W. Hope.
Secretary	G. R. Gray, Esq.
Curator	G. R. Waterhouse, Esq.

November 4th, 1833.

(Held at the Society's Rooms, No. 17, Old Bond Street.)

J. G. Children, Esq., President, in the Chair,

Who, after having spoken of the objects and origin of the Society, and of the rapid advance of the science of Entomology in this country, resigned the Chair for the remainder of the evening to the Rev. W. Kirby, Honorary President.

The By-laws of the Society were read and adopted.

William Spence, Esq., F.R.S., &c., was elected an Honorary English Member, and W. B. Spence, Esq., was appointed Foreign Secretary to the Society.

Donations.

Illustrations of British Entomology. By the Author, J. F. Stephens, Esq.

Systematic Catalogue of British Insects. By the same.

Nomenclature of British Insects, First Edition. By the same.

Ditto, Second Edition. Part I. By the same.

Synopsis of Nepaul Coleoptera. By the Author, the Rev. F. W. Hope.

Linnæi Systema Naturæ. By the same.

Dillwyn's Catalogue of the Coleopterous Insects of Swansea. By the same.

Sphinx Vespiformis, an Essay. By the Author, Edward Newman, Esq., F.L.S., &c.

Entomological Magazine, Vol. I. By the Publishers.

Six Boxes of Exotic Coleoptera and Lepidoptera. By J. G. Children, Esq.

Four Boxes of Coleoptera and Lepidoptera. By the Rev. F. W. Hope.

Several Boxes of Insects. By the Rev. C. S. Bird and Samuel Hanson, Esq.

Various Insects. By W. E. Shuckard, E. Newman, A. H. Davis, and F. Walker, Esqrs.

Memoirs, &c.

An extract of a Letter was read, containing an account of the Entomological Proceedings at the Meeting of the German naturalists at

Breslau on the 18th and 19th of September 1833. A Section for Entomology was established, having Professor Zawadski for the President, and Professors Gravenhorst and Schummel for Secretaries. M. Fitzinger of Vienna announced a new work on the *Orthoptera*, by Professor Reichenbach, and the completion of the work upon European *Lepidoptera* by Treitschke. Dr. Hammerschmidt exhibited a new Austrian species of *Gryllus*, and read a notice upon *Lophyrus piniperda*; he also announced a work by the Royal Agricultural Society of Vienna upon Noxious Insects, and communicated several Memoirs upon *Tinea granella* by Messrs. Kollar and himself, upon *Bostrichus typographus* and *villosus* by the Count de Beraldingen, upon *Haltica* by Dr. Wundram, and upon *Noctua aquilina* by M. Kollar. He also made some observations upon a new Dipterous insect, the *Cecidomyia Tritici*, which during the year had caused great ravages to the wheat in Hungary. Also upon the galls upon plants produced by insects, with an attempt at their classification, which he illustrated by figures of not less than 250 different species of galls, and the insects producing them. He also stated, that having reared the larvæ (which he exhibited) of *Eucnemis deflexicollis* and *E. pallida*, these insects were only varieties of the same species, as is also the case with *Engis humeralis* and *E. pallida*. He also exhibited various specimens of *Diaperis Boleti*, which he had reared, and which, from their great difference in size, proved that this character was inapplicable to the distinction of species; likewise two Coleopterous monstrosities, namely, a *Procrustes Coriaceus* with a tubercle on each elytron, and a *Carabus morbillosus* with a forked appendage upon each elytron; as well as two new *Coleoptera*, *Ptilium sulcatum* and *Latridius ruficollis*; a new species of *Arachnida*, *Thomisus togatus*; and some remarkable varieties of *Salticus sanguinolentus*, *Eresus 4-guttatus*, and *Epeira cucurbitina*. He also read various Memoirs upon the larvæ and imagines of *Cionus Scrophulariæ*, *Æsalus Scarabæoides*, *Nematus intercus*, *Pyrochroa coccinea*, *Nosodendron fasciculare*, *Tenebrio molitor*, *Acheta gryllotalpa*, *Staphylinus hirtus*, *Mylabris variabilis*, *Meloe proscarabæus*, *Pimpla impressor*, and *Trixagus fumatus*; and exhibited the preparatory states of the following Coleopterous insects, viz., *Scolytus Pruni*, *Coccinella impunctata*, *Saperda punctata*, *Trichodes apiarius*, *Malthinus biguttatus*, *Malachius æneus*, *Telephorus fuscus*, *Trogosita caraboides*, *Megagnathus mandibularis*, *Pyrochroa coccinea*, *Æsalus Scarabæoides*, *Silpha subterranea*, *Eccoptogaster Scolytus*, *Triplax nigripennis*, *Cerylon sulcicolle*, *Synchita humeralis*, and *Hololepta plana*. Professor Zawadski exhibited various new *Coleoptera* from the Carpathian Mountains, belonging to the *Carabidæ* and *Curculionidæ*. He also announced the return of an entomological expedition undertaken in the Balkan Mountains. Professor Schummel read a Memoir upon *Tipula*, and described two new *Diptera*, under the names of *Hammerschmidtia vittata* and *Dryomyza Zawadskii*: he also exhibited various Plates, representing species of *Lygæus, Coreus* and *Syrphus*. Professor Gravenhorst gave some account of the Proceedings of the Entomological Society of France: he mentioned the exclusion of a Lepidopterous hybrid produced from the union of *Platypteryx falcula* and *curvatula*, and read a letter from Dr. Berendt of Dantzig, upon insects found imbedded in amber. M. Rottermond communicated a mode of taking the impression of the wings of Lepidopterous insects. M. Schilling described a new mode of classifying the *Lepidoptera* from the wings. He also mentioned the discovery of a new and winged species of *Cimex* (*C. domestica*). M. Boksch mentioned a hybrid union between *Melolontha Hippocastani* and *vulgaris*, of which he had been witness. Professor Mikan of Prague read the description of thirteen new species of *Iulus* from Brazil. M. Jaensch spoke of the species of the genera *Melolontha* and *Bostrichus* injurious to agriculture. M. Klopsch read a Memoir upon the state of Entomology in the time of Aristotle; and the return of Messrs. Ecklon and Bescke from an entomological voyage to Brazil was announced.

Mr. Spence, in allusion to Dr. Hammerschmidt's Memoir upon the *Cecidomyia*, stated that the insect described by that author was specifically distinct from the long previously described *Cecidomyia Tritici* of Kirby: the injury done by the former insect is occasioned by the larva eating the stem, thereby weakening the plant, whereas the latter feeds upon the flowers of the wheat, thereby preventing their fructification. The Hessian fly described by Mr. Say—(see Loudon's 'Magazine of Natural History,' No. 3, for a notice of Mr. Say's Memoir, by Mr. Kirby,)—is also distinct, although evidently congenerous; but the immense injury which it causes is said to arise from the pressure of the pupæ against the grain while in a tender state. Mr. Spence, however, considered that this fact had need of confirmation, and called the attention of the Meeting to the necessity of minute investigation into the œconomy of the various species of insects destructive to agricultural productions.

December 2nd, 1833.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

Introduction to Entomology, 4 vols. By the Authors, Messrs. Kirby and Spence.

Fabricii Systema Rhyngotorum. By F. Walker, Esq.

Turton's Edition of Linnæi Systema Naturæ. By Mr. Charton.

Part I. of the Entomology of Australia. *Phasmata*. By the Author, G. R. Gray, Esq.

Illustrations of British Entomology, No. 59. By the Author, J. F. Stephens, Esq.

Description of *Chiasognathus Grantii*. By the same.

Zoological Illustrations, Third Series, Part *Entomology*. By the Author, W. Swainson, Esq.

Monographia Tenthredenitarum. Par M. De St. Fargeau. By J. O. Westwood, F.L.S.

Notice of the Ravages of the Cane-fly. By the same.

Description and Figure of *Desmia maculalis*, from Guerin's 'Magazin de Zoologie.' By the same.

Numerous species of Insects, of various Orders. By the Rev. F. W. Hope, Captain Blomer, and Messrs. Shuckard, Doubleday, Churton, Courtney, Pickering, Lewis, Skrimshire, and Walton.

MEMOIRS, &c.

"On the Form of the Head of Insects." By E. Newman, Esq., F.L.S., &c. Withdrawn, and published by the Author in the Entomological Magazine, No. 6.

"Descriptions of some New Australian *Coleoptera*." By the Rev. F. W. Hope. (See *ante*, p. 11. Memoir III.)

Mr. Spence communicated an extract from a letter which he had received from Mr. Edward C. Herrick of New Haven (North America), relating to the Hessian Fly, stating that the accounts hitherto published concerning it were very erroneous, and that the writer was engaged in preparing an account of its natural history, and of its five parasites, two of which he considered to belong to the genera *Eurytoma* and *Platygaster*. He considered the fly itself to be referrible to Meigen's genus *Lasioptera*.

Mr. Westwood communicated a notice of the Entomological Proceedings of the Linnæan Society. At the Meeting of the 5th of November preceding, a Memoir upon *Diopsis*, a genus of Dipterous insects, by himself, was read, containing descriptions of nearly twenty species, half of which were new. Mr. Say presented his Descriptions of new species of *Curculionites* of North America, New Harmony, Indiana, July 1831. The 36th volume of the Transactions of the Turin Academy was also presented, containing a Memoir by Professor Gene, upon *Cecidomyia Hyperici.* Mr. MacLeay sen. presented a fine Collection of Insects from New Holland. At the Meeting of the 19th of November the continuation of the Monograph upon *Diopsis* was read. The 4th volume of the Memoirs of the French Institute was presented, containing an extensive Memoir by M. Leon Dufour, upon the Anatomy of the *Hemiptera* and *Homoptera.* Lieutenant Breeton exhibited numerous specimens in spirits of a new species of Cochineal, recently discovered upon oaks in the interior of New Holland. The clear spirit had acquired the colour of red ink. Mr. Yarrell exhibited portions of the beams of a house perforated in various directions apparently by the larvæ of some of the *Ptinidæ.*

Mr. Waterhouse called the attention of the Meeting to some peculiarities which he had observed in the Stag-beetle (*Lucanus Cervus*), and stated that he had lately kept a male specimen of that insect alive for several weeks, his object being to ascertain the use of the mandibles and some other organs. From his observations it appeared evident that the mandibles are employed in procuring subsistence, possibly by wounding the bark of young trees, in order to cause the sap to flow, upon which these insects feed. The specimen in question was kept alive by feeding it with sugar and water; it also seemed fond of the juice of raspberries and other saccharine substances. For the purpose of lapping up juices or other fluid matters, it appears to have an extraordinary power of thrusting out the maxillæ, the galea or terminal portion of which is extremely long and flexible (not unlike the tongue of a bee). It carefully avoided touching anything with the antennæ, although these organs were kept continually in motion, as if for the purpose of feeling: if by chance they became smeared with sugar or any other matter, the insect immediately cleaned them by drawing them between the thigh of the fore leg and the underside of the thorax, in both which parts a velvet-like patch of hair is to be observed, which is well adapted for such purpose. That the mandibles were employed as above mentioned appeared evident, from the insect frequently biting the raspberry, to wound it, before it applied the maxillæ; it also frequently bit Mr. Waterhouse's finger, without, however, causing a wound, and afterwards applied the maxillæ, but finding no fluid, it renewed its attempts several times. The specimen became very tractable, and would show a playful humour at times by tossing a ball of cotton about with its mandibles, and holding it up in the air.

Lieut.-Col. Sykes observed, that the same kind of playfulness was occasionally to be noticed in the prototypes of the *Lucanus*, the Stag and Deer tribes.

The President alluded to the death of Adrian Hardy Haworth, Esq., F.L.S., H.S., Cæs. Soc. Nat. Hist. Moscow, Soc. Roy. Hort. des Pays Bas, &c., whereupon it was resolved to enter the regrets of the Society upon the Minutes of its Proceedings, on account of the loss which Science, especially Entomology, has sustained by his lamented decease.

January 6th, 1834.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

Illustrations of British Entomology, No. 60. By the Author, J. F. Stephens, Esq.

Memoir on the Connexion between the Land and Water *Cimicidæ*, and Description and Figure of *Encephalus complicans*. By the Author, J. O. Westwood, F.L.S.

A Box of Chinese Insects. By T. S. Bowerbank, Esq.

150 Species of New Holland Insects. By the Linnæan Society of London.

24 Species of British Insects. By Mr. R. H. Lewis.

MEMOIRS, &c.

"Explanation of the sudden Appearance of the Web-spinning Blight of the Apple Hawthorn, &c." By R. H. Lewis, Esq. (See *ante*, page 21. Memoir IV.)

"Description of the Larva of *Raphidia Ophiopsis*." By G. R. Waterhouse, Esq., Curator. (See *ante*, page 23. Memoir V.)

"Descriptions of the Larvæ and Pupæ of several Coleopterous Insects." By the same. (See *ante*, page 27. Memoir VI.)

"Description of *Ripipteryx*, a new genus of *Orthoptera*." By Edward Newman, Esq., F.L.S. Withdrawn, and published by the author in the Entomological Magazine, No. 7. Mr. Newman added some verbal remarks upon the habits of the nearly allied genus *Tridactylus*, from the 'Observations sur le *Tridactyle panaché*' of M. Foudras of Lyons, published in 1829.

Continuation of the Rev. F. W. Hope's "Descriptions of New Exotic Coleoptera." (See *ante*, page 11.)

Notice of the Entomological Proceedings at the Linnæan Society. Communicated by Mr. Westwood. At the Meeting of the 3rd of December four Memoirs by Signor Passerini were presented: upon *Leucania Zeæ*, Bdv., the larvæ of which attack Indian corn; upon the noise produced by *Sphinx Atropos*; upon *Oscinis Oleæ*, the larvæ of which feed upon the olives in Italy; and upon *Tinea olivella*, the larvæ of which feed upon the leaves of the same plant. At the Meeting of the 17th December the conclusion of Mr. Westwood's monograph upon *Diopsis* was read. The 18th, 19th, and 20th volumes of the 'Mémoires du Muséum d'Histoire Naturelle' were presented, containing Lyonnet's posthumous Researches; also the 1st and 2nd volumes of the 'Nouv. Annales du Muséum d'Histoire Naturelle,' containing Memoirs upon the *Thysanura* and upon *Prosopistoma* by Latreille, a Memoir upon the *Coleoptera* of French Guiana by Lacordaire, and a Memoir upon the *Lepidoptera* of Madagascar by Boisduval. Mr. J. E. Gray's Memoir, read at the Zoological Society, upon the *Cirrhipeda*, disproving the statements of Mr. J. V. Thompson relative to the transformations which they undergo, was also noticed.

The Rev. F. W. Hope exhibited two pieces of wood, communicated by Captain Walter Smee, one of which had been greatly perforated by the *Termites* in the East Indies, and the other by a large species of bee (*Xylocopa*), together with other substances which had been destroyed in the same manner by the former insect. Captain Smee remarked that, from observations which he had made in India, it appeared to him that the *Termites* were much more destructive in consequence of a powerful acid which they leave upon everything they pass over than from their merely feeding upon such substances.

Mr. Westwood, in allusion to the destructive habits of the wood-boring insects, read an extract from a letter from Mr. Denson, relating to the devastation caused by *Ptilinus pectinicornis* upon a newly made bed-post, which, although formed of sound wood, was obliged to be burnt in the course of two or three years afterwards in consequence of its having been attacked by myriads of that insect. A portion of the post was exhibited, and it appeared that its interior was very dry, and became pulverised at the slightest touch: this was the case with such portions as lay between the tracts of the insects. Whether this decay was consequent upon these attacks, or whether, having become thus decayed, it had afforded a habitation for the insects easy of formation from its softness, or more relishing to their taste from being in such state of decay, he would not attempt to decide.

Mr. Westwood also read a description of a minute new Coleopterous insect which destroys the bindings of books, *Tomicus eruditus*. (See *ante*, page 34. Memoir VII.)

Mr. Skrimshire noticed the ravages of another of the Ptinideous insects, a species of *Anobium*, which he exhibited, and which feeds upon prepared pearl barley in the larva state.

It was resolved that the Anniversary Meeting should be held on the ensuing fourth Monday in January, for the election of a new Council and Officers.

Anniversary Meeting, January 27th, 1834.

In pursuance of the By-laws, the four following gentlemen were removed from the Council:

N. A. Vigors, Esq., M.P.
A. H. Davis, Esq.
Dr. Horsfield.
J. E. Gray, Esq.

and the four following gentlemen elected into the Council in their stead:

Thomas Bell, Esq.
Francis Walker, Esq.
W. E. Shuckard, Esq.
J. O. Westwood.

The following gentlemen were elected as Officers for the ensuing year:

President	J. G. Children, Esq.
Treasurer	Rev. F. W. Hope.
Secretary	J. O. Westwood.
Foreign Secretary . .	W. B. Spence, Esq.
Curator	G. R. Waterhouse, Esq.

February 3rd, 1834.

J. G. Children, Esq., President, in the Chair.

Donations.

Index Entomologicus, No. 1. By the Author, W. Wood, Esq., F.L.S., &c.

Pallas, Icones Insectorum Rossiæ, &c. By the same.

Desmarest, Considerations Générales sur les Crustacés. By the Rev. F. W. Hope.

Notice sur le Phlocerus, par Dr. Fischer. By the same.

Three Plates of Comte's Illustrations of the 'Règne Animal.' By the same.

Illustrations of British Entomology, No. 61. By the Author, J. F. Stephens, Esq.

Memoir upon a Parasitic Species of the Cynipidæ. By the Author, J. O. Westwood, F.L.S.

Notice sur les Metamorphoses des Ceratopogons, par M. Guerin. By the same.

Notice sur deux Nouveaux Genres de l'Ordre des Coléoptères, par M. Guerin. By the same.

Specimens of *Mormolyce phylloides*, *Chrysophora chrysochlora*, *Buprestis opulenta*, *Sagra Boisduvalii*, and *Hipparchia Blandina*. By J. G. Children, Esq.

50 Genera of Exotic Coleoptera. By the Rev. F. W. Hope.

Several Species of *Chalcididæ*. By F. Walker, Esq.

The President nominated as Vice-Presidents for the ensuing year Thos. Bell, Esq.; J. F. Stephens, Esq.; Lieut.-Col. Sykes; and the Treasurer, the Rev. F. W. Hope; upon each of whom he passed an elaborate encomium.

The President announced the opening of Subscriptions for the additional purchase of Books and Cabinets for the use of the Society.

Memoirs, &c.

Notice of the Entomological Proceedings at the Linnæan and Zoological Societies, communicated by Mr. Westwood. At the Meeting of the former Society on the 21st of January, a Paper by Mr. Schomburgh was read, including several notices of the attacks of the *Termites* upon a large silk-cotton tree in St. Thomas's Island, West Indies. The 4th and 5th volumes of the Bulletin of the Imperial Society of Naturalists at Moscow, containing various Entomological Memoirs, were presented. At the Meeting of the latter Society on the 28th of January, Mr. W. S. MacLeay's Memoir upon *Urania* and *Mygale*, since published in the Transactions of that Society, was read; the former portion of which was especially interesting, from being completely at variance with M. Boisduval's Memoir upon that genus, published in the 'Annales de la Société Entomologique de France.'

"Account of a Small Species of Weevil, found in Tamarinds (*Ca-*

landra Tamarindi)." By W. Christy, Jun., Esq., F.L.S. (See *ante*, page 36. Memoir VIII.)

Continuation of "Descriptions of new exotic Coleoptera." By the Rev. F. W. Hope. (See *ante*, p. 11.)

"Observations upon the Œconomy and Description of a Gregarious Species of Butterfly from Mexico." By J. O. Westwood, F.L.S. (See *ante*, page 38. Memoir IX.) This Memoir was prefaced by some remarks upon the typicality of groups as evinced not only by superiority of organization, but by the greater degree of instinctive development.

"Descriptions of some Australian Species of *Phasmata*." By G. R. Gray, Esq. (See *ante*, page 45. Memoir X.)

"Descriptions of some new Genera of British *Homoptera*." By R. H. Lewis, Esq. (See *ante*, page 47. Memoir XI.)

The Rev. F. W. Hope read a Notice of several Species of Insects found in the heads of Egyptian Mummies, some of which had been extracted from the head of a female mummy with plaited hair, which was exhibited at this Meeting by Mr. Wilkinson, the celebrated Egyptian traveller, by whom it was brought from Thebes. The following is a list of the recorded mummied insects, including those described by Mr. Hope in this Communication, and which is extracted from a 'History of Egyptian Mummies,' &c., by Thos. Jos. Pettigrew, F.R.S., &c.: London, 1834.

1. *Corynetes violaceus*, Fab. *Vid.* Linn. Trans., vol. xiv., Appendix.
2. *Necrobia Mumiarum*, Hope in *op. cit.*, p. 54. pl. V. fig. 1—3 *a*—*d*. Purpurascens, hirta, antennis pedibusque flavo-rubris. Totum corpus fere supra violaceum, punctatum, marginibus elytrorum rufescentibus lineato-punctatis. Corpus infra nigrum, hirtum, pedibus flavo-rubris. Long. lin. 3, lat. lin. 1¼.

Mr. Hope thinks it probable that these insects when alive were of a violet or deep purple colour, the medicaments used in the process of embalming having partly discharged the colouring matter. Some of them also exhibit the appearance of immaturity.

3. *Dermestes vulpinus*, Fab. *Vid.* Linn. Trans., vol. xiv., Appendix.
4. *Dermestes pollinctus*, Hope in *op. cit.*, p. 55. pl. V. fig. 4—7 *j*. imago 8—9 *e*—*l*. Larva of ditto and details (*l* representing the eyes of the latter, and not the ova, as described in p. 261). Totum corpus supra castaneum, subtomentosum, pedibus concoloribus abdomineque infra albido. Caput fusco-rubrum oculis nigris, antennis rubro-castaneis. Thorax castaneus,

punctatus, medio nigricanti, marginibusque lateralibus albo tomentosis. Scutellum hirsutum seu pilis albis obsitum. Elytra castanea, subtomentosa. Corpus infra albido-pilosum, segmentis abdominis castaneo-maculatis, trigonoque concolori in medio singulorum posito. Pedes castanei. Long. lin. 4, lat. lin. 2.

Mr. Hope imagines that the remarkable light colour arises probably from the exclusion of light, and not in this case from the drugs used in embalming. From one skull more than 270 tolerably perfect specimens were taken, and from the remaining fragments of others, probably double that number lived, propagated their species, and died without ever seeing the light. The perfect pupæ are not abundant. "The remains of the empty cases, however," observes Mr. Pettigrew, "would lead me to believe that the greater part of them arrived at the imago state some time after the process of embalming was completed, when, as mummies, they were deposited in their respective mausolea."

5. *Dermestes Roei*, Hope, in *op. cit.*, p. 55. Totum corpus supra nigrum subtus albo-pilosum. Antennæ capitulo nigro, cæteris articulis rubris. Thorax ater, lateribus cinereo-villosis. Corpus infra albo-pilosum, lateribus abdominis antice maculâ magnâ ovatâ notatis, posticeque segmentis utrinque minoribus maculis variegatis. Long. lin. 3, lat. lin. 1½.
6. *Dermestes elongatus*, Hope, in *op. cit.* p. 55. Differs from all others of the genus by its elongate oblong form, but is in too mutilated a state to describe, the antennæ and legs being wanting.
7. *Pimelia spinulosa*? Klug. Remnants apparently of this species of *Pimelia*, which is common in Egypt, were found in one of the mummies.
8. *Copris Sabæus*? Found by Passalacqua, embalmed, and so named on the testimony of Latreille.
9. *Copris Midas*, Fabr.
10. *Copris Pithecius*, Fabr.
11. A species of *Cantharis*, on the collection of Passalacqua, from Thebes. (No. 442.)

Pupæ of Dipterous Insects.—In the head of one mummy was found a considerable quantity of the pupæ of Dipterous insects, apparently a distinct species, and from their appearance Mr. Hope was led to remark that the process of embalming could not possibly be a rapid one. Some of the pupæ cases were empty, and the major part of them contained the dried up insects almost in a state of perfection. In another mummy were also found immense numbers of the pupæ of some Dipterous insects, certainly of three different species, if not more.

Mr. Hope made some observations upon the great age of these insects, which might probably be estimated at 3000 years.

Mr. Pettigrew stated that although the period of embalment was involved in great obscurity and extended over a very considerable space of time, yet he considered the skull, from the occipital cavity of which the *Necrobiæ* and *Dermestes* had been taken, to be of the Græco-Egyptian æra, and the hair of which, contrary to the assertion of the Count de Caylus, was in fine preservation and of considerable length, there being three plaited portions turned up from behind over the skull, precisely in the way the Egyptians of the present day wear their hair, and which, as his daughter informed him, happened also to be the fashion of the present day in this country. He also observed that, from the great number of insects which he had extracted from the skulls of two mummies, the process of embalming must have been a very tedious one. In some mummies, however, no insects were discovered, as in the one recently opened at the College of Surgeons. The same gentleman also exhibited two funereal breast-tablets of mummies, from the collection of Samuel Rogers, Esq., the celebrated poet, upon both of which were sculptured the sacred Scarabæus. One of them, which had been brought to England by Belzoni, was composed of black basalt, and carved in alto-relievo; it measures four inches in length and three in breadth. The Scarabæus is represented in the centre of a boat, at the extremity of which are represented the goddesses Isis and Nephthys, and on the reverse is an hieroglyphical inscription, arranged so as to correspond with the outline of the beetle, and at the extremities of the boat are placed figures of the goddess Isis. It is represented in Mr. Pettigrew's work, plate VIII. fig. 1 and 2. The other tablet was composed of common pottery, being ornamented with similar representations to those upon the foregoing, and is figured upon the same plate, fig. 3.

Mr. Westwood observed, with reference to the great age of the insects in question, that the circumstance of so many of them being found dead in their preparatory stages (although in a situation perfectly congenial to their habits) seemed sufficient to prove that they must have been deposited in the head of the mummy during the operation of embalment, and killed by the ultimate process, instead of making their way to the body of the mummy at a more recent period, as might, perhaps, be imagined to be the case from the known œconomy of some of the species.

JOURNAL OF PROCEEDINGS.

(Continued.)

March 3rd, 1834.

J. G. Children, Esq., President, in the Chair.

CAPTAINS Sir John and James Ross were present amongst the visitors.

DONATIONS.

Johannes Gædartius, De Insectis;
Forster, Novæ Species Insectorum. Centuria 1ma;
Redi, De Insectis;
Fabricius, Nomenclator Entomologicus;
Instructions for collecting British Insects. By Abel Ingpen, A.L.S.
All presented by Mr. Ingpen.

Gravenhorst, Monographia Coleopterorum Micropterorum. By the Rev. F. W. Hope.

Gyllenhall, Insecta Suecica, vol. 1.; and No. 61 of Illustrations of British Entomology. By J. F. Stephens, F.L.S., &c.

Harris, Exposition of English Insects. By W. Christy, Jun., Esq., F.L.S.

Observations sur le Nid d'une Araignée. Par M. V. Audouin; and
Notices of British Parasitic Hymenoptera, By J. O. Westwood, F.L.S. Both presented by Mr. Westwood.

71 Species of European Coleoptera. By Rob. Spence, Esq., M.E.S.

MEMOIRS, &c.

Letters were read from M. V. Audouin of Paris, Dr. Gravenhorst of Breslaw, and M. De Haan of Leyden, returning thanks for the honour of their election as Foreign Honorary Members of the Society.

Also an extract from a letter from Signor Passerini, desiring to enter into correspondence with the Society.

Notice of the Proceedings at the Linnæan and Zoological Societies relative to Entomology. Communicated by the Secretary.

LINNÆAN SOCIETY, *February 4th and 18th*, 1834.—Read the continuation and conclusion of Professor Schomburgh's account of large trees in various parts of the world, especially that of a cotton tree in the West Indies. The memoir contained a long-and interesting notice of the habits of the white ants (*Termites*), which infested this tree, and which, from the uncertainty which exists as to the real nature of the various kinds of individuals forming their communities, are peculiarly worthy of the attention of entomologists going abroad.

Amongst the books presented to the Linnæan Society at these meetings may be mentioned Palisot de Beauvois's splendid work on the Insects of Africa and America: the Memoirs of the St. Petersburgh Imperial Academy, Vols. 1 and 2., containing Mannerheim's Revision of the *Staphylinidæ*, and a Catalogue of the *Coleoptera* and *Lepidoptera* of Caucasus and its Vicinity, by M. Menetries, amounting to about 1000 species, including various new species and a few new genera: and the Annales des Sciences Naturelles for October and November 1833, containing a valuable Memoir by Dutrochet on the internal anatomy of the *Aphides*, with reference to the question of their supposed hermaphroditism, and descriptions of various Spanish *Diptera*, by M. Dufour.

Zoological Society, *February* 11*th*.—Read the continuation of a Paper, by Mr. W. S. MacLeay, upon the genus *Mygale*, or Bird-catching-Spiders, as they have been erroneously termed, in consequence of Madame Merian's fabulous account of their natural history. The author details the habits of one species which abounded in his garden in Cuba, where it resides in holes under stones, feeding only upon mole-crickets, cockroaches, &c., and being unable to spin a web; its habits are in fact essentially nocturnal. Examples of this species of large size would not attack a humming-bird of the smallest size, even when offered to them. From a review of the writings of the early voyagers to the West Indies, Mr. MacLeay supposes that the mistaken notion has originated in their statements, that the webs of some of the spiders in those islands are of so great strength that they could hold a small bird if caught in them. The largest of these web-spinning spiders in Cuba is the *Nephila clavipes* of Leach; but so little fear have the humming-birds of this species, that even the smallest species has been repeatedly observed by Mr. MacLeay in the act of examining their webs, and picking the already caught flies out of them. It is well for British entomologists that we have no such sagacious humming-birds in our country, as some of our rarest insects have been caught in spiders' webs; amongst which may be mentioned the interesting species *Stylops tenuicornis* of Kirby. Collectors of minute insects ought never to omit examining these webs in their entomological excursions.

The following Papers were also read.

"Observations upon Succinic Insects." By the Rev. F. W. Hope, who exhibited numerous specimens of insects imbedded in amber and gum animé in illustration of his memoir.

"Description of *Prionus* (*Remphan*) *Hopei*, a new Species of Longicorn Beetle." By G. R. Waterhouse, Esq., M.E.S.

"A few Cursory Observations upon the Habits of the Indigenous Aculeate *Hymenoptera*, suggested by M. de St. Fargeau's Paper upon the genus *Gorytes*." By W. E, Shuckard, Esq., M.E.S. See p. 52.

The President exhibited a Case of Insects, including a beautiful species of *Colias*, &c., brought from the Arctic Regions by Captains Sir John and James Ross, upon whom he passed a high encomium, not only for their gallant services, but also for the zeal which they had manifested towards the advancement of science in the midst of overwhelming dangers.

By permission of the Zoological Society of London, two other Cases of Insects, brought home by Captain Lyons, were also exhibited, some of which, belonging to the Crustaceous order *Isopoda*, were amongst the subjects described in the memoir next read, entitled "Observations upon the Osculant Crustaceous Genus *Arcturus* of Latreille, with the Description of a British Species." By J. O. Westwood.

The Rev. F. W. Hope exhibited, by permission of the Naval and Military Museum, a fine undescribed cornuted Lamellicorn Beetle, brought from Venezuela by Sir R. Kerr Porter, and named by the Indian natives *Golofa*, whence Mr. Hope proposes to term it *Golofa Porteri*.

The Secretary, on behalf of Mr. Hope, requested information from Members upon the subject of Insect Monstrosities, upon which he is at present occupied.

April 7th, 1834.

J. G. Children, Esq., President, in the Chair.

Samuel Hanson, Esq., and Dr, Roget, Sec. R.S., were elected into the Council in the stead of F. Walker and E. Newman, Esqrs., resigned.

Donations.

Aussereuropaische Zweifleigelige Insekten, 2 vols., accompanied by a Letter from Dr. Wiedemann, Hon. For. Member of the Society, the Author thereof.

Berkenhout, Synopsis of Natural History. By the Rev. F. W. Hope.

No. 62 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

No. 3 of the Index Entomologicus. By W. Wood, Esq., the Author thereof.

About 300 Species of British and Foreign Coleoptera and Hymenoptera. By F. Walker, Esq.

Various British Lepidoptera. By Mr. G. A. Griesbach.

Various Exotic Coleoptera and Lepidoptera. By Mr. Ingpen.

A Box of British Coleoptera, principally from the neighbourhood of Cambridge. By C. C. Babington, Esq.

The following Books, purchased at the Sale of the Library of the late Mr. Haworth, were also upon the table, the President taking occasion to call the attention of the Meeting to the Book Subscription;

Latreille, Genera Crustaceorum et Insectorum, 4 vols.
Meigen, on Europæan Diptera, 6 vols.
Dejean, Species Général des Coléoptères, 3 vols.
Duftschmidt, Fauna Austriæ, 3 vols.
Kirby, Monographia Apum Angliæ, 2 vols.
Ochsenheimer and Treitschke, on Europæan Lepidoptera, 5 vols.
MacLeay, Annulosa Javanica.

Louis Hayes Petit, Esq., M.P., F.R.S., Sir Henry Edwardes, Bart., and Thomas Prichard, Esq., were elected Members of the Society; and M. Schönherr of Skara in Sweden, and Signor Passerini of Florence, were elected Foreign Honorary Members.

Memoirs, Exhibitions, &c.

Letters were read from M. Lefebvre, Sec. Soc. Ent. de France, and Dr. Wiedemann of Kiel, returning thanks for the honour of their election as Honorary Foreign Members of the Society.

Mr. Ingpen, A.L.S., exhibited a curious Lepidopterous Larva from St. Vincents.

Mr. G. R. Gray exhibited several specimens of a Geometrideous Larva from China, from the heads of which a long and slender fungus had been produced, which specimens are highly prized by the Chinese, being considered to possess stimulating powers similar to the *Cantharidæ.*

The Rev. F. W. Hope exhibited a magnificent Exotic Species of *Palinurus.*

The following Memoirs were read:

Notice of the Entomological Proceedings of the Linnæan Society during the month of March, communicated by the Secretary, and consisting of "A Paper on the Neuropterous Genus *Embia* of Latreille. By J. O. Westwood, F.L.S." This genus is composed of a few exotic species allied to the white ants, but differing from them in the shortness of the wings, which do not extend beyond the extremity of the body, &c. The anterior tarsi are singularly dilated. It was noticed that each of the three species described presented distinguishing characters of a subgeneric rank, and that each is from a distinct quarter of the globe.

"Memoir upon the Habits of various Indian Insects." By W. W. Saunders, Esq., F.L.S., &c. See p. 60.

"Observations upon a Mode practised in Italy of excluding the House-fly from Apartments." By W. Spence, Esq., F.R.S. See p. 1.

"Notice of the Larva of *Cucullia Thapsiphaga*." By Mr. B. Standish.

"Continuation of a Memoir upon Succinic Insects." By the Rev. F. W. Hope.

Dr. Ure, F.R.S., who was present as a visitor at the Meeting, having been called upon by Mr. Hope, stated that at that gentleman's request he had minutely analysed various resins, asserted to contain insects, and that he had ascertained that gum copal (in which no insect had been yet clearly proved to exist) never contained *Oleum Succinum*, and was perfectly soluble; whereas animé (in which alone insects had been found by Mr. Hope) was always found to contain the *Oleum Succinum* in abundance, and could never hitherto be entirely solved; thus establishing the affinity of the latter resin with amber, which exhibited similar properties. Dr. Ure entered fully into the details of various experiments made in analysing these substances; and added, that he had obtained results of great practical utility, by the application of the new ethereal essence of caoutchouc, in which, when united with a little spirits of wine, the animé was almost entirely soluble, forming a beautiful varnish, which dries in a very short time.

Lieut. Col. Sykes exhibited a small snake, which had been captured by gum falling upon it whilst moist, and which in its writhings had run itself through with a thorn. He also stated, with reference to Mr. Saunders's communication, respecting the Indian Eumenes (see p. 62.) that this species not only makes its nest in flute-holes, but also that if a house in India remain unoccupied for a few months many of the locks will be blocked up by the nests of the insect.

He also observed, that Mr. Spence's communication respecting the mode of exclusion of the domestic fly would be received with gratitude throughout India, although he could state from experience that gnats penetrated through the musquito bed-curtains. Whereupon Mr. Spence noticed the necessity which existed for minutely investigating the circumstances attending the apparent abhorence of flies to pass through nets.

Mr. Westwood, in noticing Mr. Saunders's observations upon the Indian species of *Pelopæus* (see p. 63.) and with reference to Mr. Shuckard's memoir upon the Fossorial Hymenoptera, read at a former meeting, mentioned that the structure of the female insect warranted the conclusion of Mr. Saunders as to its parasitic habits; the fore legs in that sex, instead of being strongly ciliated, as in the real burrowing hymenoptera, being simple, thus confirming the views of M. de St. Fargeau.

May 5th, 1834.

J. G. Children, Esq., President, in the Chair.

Donations.

History and Proceedings of the Berwickshire Naturalist's Club. Presented by that Society.

Number 63 of Illustrations of British Entomology. By J. F. Stephens, F.L.S., the Author thereof.

The Honey-Bee. Presented by Dr. Bevan, the Author thereof.

Descriptions of some new British species of the May-flies of anglers; and observations upon the genus *Achlysia* of M. Audouin. By John Curtis, Esq., F.L.S., &c., the Author thereof.

Revue Entomologique. Par G. Silbermann, Nos. 1. 2, 3, 4. Presented by the Rev. F. W. Hope.

Elogio Storico di Franco Andrea Bonelli, scritto dall' Academico Professore Guiseppe Gené (Director of the Museum of Natural History of Turin);

Saggio di una Monografia delle Forficule indigene. By the same Author;

Osservazioni sulle abitudine e sulla Larva dell' *Apalus bimaculatus*. By the same; and

Memoria di una specie di Cecidomia. By the same. All presented by Professor Gené.

Monographie du genre Diaperis. Par MM. Laporte et Brullé;

Descriptions et Figures de quelques Arachnides nouveaux. Par M. Léon Dufour;

Description de la Nycteribie de Vespertilion. By the same;

Description de quelques espéces du genre Phalangium. By the same;

Description du Xylocoris rufipennis. By the same. All presented by J. O. Westwood.

Dejean, Species général de Coléoptères, Vols. 4, 5 and 6, were also upon the table, purchased by the Society.

Twenty species of British Lepidoptera and Coleoptera. By W. Raddon, Esq.

Specimens of the Ink Gall Nut, and of the insect by which it is produced (*Cynips gallæ tinctoriæ*). Presented by Dr. Burton.

MEMOIRS, EXHIBITIONS, &c.

Letters were read from Signor Passerini and Dr. Hammerschmidt, of Vienna, returning thanks for their election as Honorary Foreign Members of the Society.

The Rev. F. W. Hope communicated a letter and drawing which he had received from Mr. J. F. Davis of Bath, relative to a supposed fossil insect, found in the coral rag at Steeple Ashton, apparently belonging to the *Isopodous Crustacea*.

The same gentleman also exhibited a large collection of Fossil Crustacea, collected by himself in the Isle of Sheppey.

Mr. Westwood exhibited a specimen of *Andrena nigroænea*, the four terminal joints of one of the tarsi of which had been devoured by an ant, the head of which alone remained attached to the limb. It had been captured in this state by himself whilst on the wing. He read some notices in illustration of the pertinacity with which ants attack larger objects: thus the *Formica elongata*, Oliv., attacks with its jaws, "et d'une maniere opiniâtre," the antennæ and legs of a green Melolontha of Tranquebar. Messrs. Kirby and Spence mention an instance in which *Colliuris longicollis* was observed to have a minute dead ant, scarcely a thirteenth of its size, fixed by its jaws to one of the legs; and in another case, an ant although deprived of half its body, contrived previously to expiring to carry off ten of the white pupæ into the interior of the nest. ('Introduction to Entomology,' vol. ii. p. 101. and vol. i. p. 366.)

The following Memoirs, &c. were read:

Notice of the Proceedings at the Linnæan Society during the month of April, relative to Entomology, communicated by the Secretary, and consisting of a memoir by Edward Newman, Esq., F.L.S., upon the transformations of insects, subsequently published by the author in the Entomological Magazine; also of the exhibition by Mr.

Davidson of specimens of the Cane Fly of the West Indies, *Delphax saccharivora*.

"Descriptions of two new Coleoptera from the Swan River." By the Rev. F. W. Hope.

"Remarks upon a Passage in Herodotus referred to in Mr. Spence's Paper read at the last Meeting relative to Gnats." By W. B. Spence, Esq., For. Sec. E.S. (See p. 7.)

"Observations on the most effectual Modes to be adopted for discovering successful Remedies against the Ravages of Insects, with a short Account of the Onion Fly, *Anthomyia ceparum*." By J. O. Westwood. Subsequently published by the author in the Magazine of Natural History, vol. vii. p. 425.

"Descriptions of various Insects found in *Gum animé*." By the Rev. F. W. Hope.

"Supplementary Notes upon the Habits of the Indigenous Fossorial Hymenoptera." By W. E. Shuckard, Esq. (See p. 58.)

"Further notice of *Cucullia Thapsiphaga*." By Mr. B. Standish.

The Rev. F. W. Hope read a letter containing an account of the great injuries recently caused by the grub of the *Tipula oleracea* upon grass lands, and requesting information as to the most effectual means for preventing its extension; with reference to which, Mr. Spence observed that some years ago the neighbourhood of Holdernesse was similarly attacked, but although many remedies were then proposed, none had been found successful.

Mr. Yarrell, in allusion to the remedies proposed by Mr. Westwood against the Onion fly, and by *Rusticus* of Godalming against the Turnip fly (*Haltica nemorum*) in the 'Entomological Magazine,' observed, that as the seeds of the two plants attacked by these insects are inclosed in compact and closed pods which are carefully gathered by the seedsmen before they burst open, it was difficult to suppose that the parent fly could deposit her eggs upon the seeds of those plants, as had been suggested by those authors; and added that the minute particles attached to the turnip seed mentioned by Rusticus exhibited no resemblance to the eggs of insects.

A lengthened discussion took place on the subject of the ravages of insects in general and the proposed remedies, and it was agreed that the Society would gladly receive communications from any person, although not a member of the Society, who had noticed the proceedings of these of any destructive insects, or who had discovered any successful remedy against their attacks.

Mr. Stephens observed that the moth reared by Mr. Standish and supposed to be the *Cucullia Thapsiphaga* appeared to him to be a new species belonging to a subgenus distinct from *Cucullia*, and of which another new British species had also come under his notice, and promised to lay an account of these insects before the society at a subsequent meeting.

June 2nd, 1834.

The Rev. W. Kirby, F.R.S., Honorary President, in the Chair.

DONATIONS.

Recherches pour servir à l'Histoire Naturelle du Littoral de France, Annelides, 1me partie 1834. Par MM. Audouin et Edwards;

Notice sur Georges Cuvier. Par M. Audouin;

Recherches pour servir à l'Histoire Naturelle de Cantharides. By the same;

Observations sur le Nid d'une Araignée. By the same;

Lettre sur la Génération des Insectes. By the same;

Discours prononcé sur la Tombe de M. Latreille. By the same;

Exposition de l'Anatomie comparée du Thorax des Insectes ailés. Par M. MacLeay, accompagnée de Notes par M. Audouin;

Notice sur les Travaux de M. Audouin;

Rapport par M. Cuvier sur un Ouvrage de M. Audouin: viz., Recherches Anatomiques sur le Thorax des Animaux Articulés;

Description de l'Hipponoe, nouveau genre d'Annelides. Par MM. Andouin et Edwards;

Mémoire sur l'Anatomie et Physiologie des Crustacés. By the same;

Rapport, par M. Cuvier, sur trois Mémoires de MM. Audouin et Edwards, sur les Animaux Invertébrés du Littoral de France;

Report by M. Geoffroy Saint Hilaire, upon a Memoir by the same Authors, consisting of Anatomical Researches upon the Nervous System of the *Crustacea*;

Report by Messrs. Cuvier and Dumeril upon the Researches of the same Authors upon the Invertebrated Animals of the Coast of France; All presented by M. Victor Audouin, Professor at the Jardin des Plantes, Paris. For. Hon. Member of the Society.

Beitrage zur Lehre von der Geographische Verbreitung der Insekten. By Professor Reich, of Berlin. Presented by the Author.

Annales de la Société Entomologique de France, vols. 1. and 2. Presented by that Society.

Number 3 of British Entomology, 2nd Edition (without plates). By J. Curtis, Esq., F.L.S., the Author thereof.

Google

Scopoli, Entomologia Carniolica;

Leeuwenhoek, Epistolæ ad Societatem Regiam Anglicam;

Leeuwenhoek, Arcana Naturæ detecta. 2 vols. All presented by Mr. W. Bainbridge, M.E.S.

Specimens of the Larvæ and Pupæ of the various species of Coleopterous Insects described in the Memoirs read before the Society. By G. R. Waterhouse, Esq., Curator.

Specimens of the *Delphax saccharivora* and *Bruchus Cæsalpiniæ*. By J. O. Westwood.

Specimens of *Formica unifasciata*, Latr. By Mr. Spence.

John Arthur Power, Esq. Queen's Coll. Cambridge, was elected a Member of the Society.

Memoirs, Exhibitions, &c.

The establishment of Prizes by the Council for Essays upon the noxious species of Insects was announced. See Prospectus published in the 1st Part.

Letters were read from M. Schönherr, returning thanks for his election as Foreign Honorary Member of the Society, announcing the transmission of his work upon the *Curculionidæ* to the Society, and recommending Count Mannerheim as Foreign Member of the Society; and from M. Lefebvre, Secretary to the Entomological Society of France, announcing the wish of that society to enter into communication with the Entomological Society of London, and the transmission of the Transactions of the French Society.

"On the apparent Identity of *Sphinx ephemeræformis* of Haworth, with *Psyche plumifera* of Ochsenheimer." By J. F. Stephens, Esq., V. P.

"Descriptions of the Larvæ of several species of Coleoptera, and of the Pupa of *Raphidia*." By G. R. Waterhouse, Esq., Curator E.S. (See pp. 23—27.)

"Observations upon the Habits of *Odynerus antilope*." By J. O. Westwood.

"*Thysanuræ Hibernicæ*, or descriptions of such species of Spring-tailed Insects (*Podura* and *Lepisma*, Linn.) as have been observed in Ireland." By R. Templeton, Esq., with some introductory observations upon the order. By J. O. Westwood.

Mr. Westwood read an extract from a letter received from Carthagena, and communicated by the Editor of the Magazine of Natural History, relative to the ravages of a species of *Bruchus* upon the seeds of the Dividivi, (*Cæsalpinia coriaria*), the legumes of which are so valuable as a substitute both for oak bark and galls.

Mr. Spence made some observations upon the great annoyance recently caused by swarms of the minute ant (*Formica unifasciata*) to the inhabitants of the houses in several parts of Brighton, as well as in London; and which had, in some instances, increased to such an extent that the latter were under the necessity of quitting their residences, the ants devouring or attacking every article. Mr. Spence mentioned that the only plan hitherto discovered for their destruction was to lay down pieces of raw meat, which they assailed in great numbers, and then to throw down boiling water over them.

The Rev. W. Kirby mentioned that in some parts of Suffolk the largest species of British ant (*Formica rufa*) had been equally troublesome. He also noticed having observed ants at work by moonlight, a fact which had been doubted.

Dr. Horsfield suggested that the most effectual mode of destroying the former insects would be by fumigation by sulphur.

July 7th, 1834.

J. G. Children, Esq., President, in the Chair.

Donations.

Proof Impression of the Portrait of the Rev. W. Kirby. Presented by Mr. Lupton. It was unanimously decided that this admirable likeness of the Honorary President should be framed and suspended over the President's chair in the meeting-room of the Society.

Centurie de Carabiques nouveaux. Par M. Gory;

Description et Figures de *Pamborus Guerini*, *Zuphium fuscum*, *Cordistes 4-maculatus*, *Oxycheila distigma*, *Callicnemis Latreillei* et *Trochalus rotundatus*. By M. Gory. From the 'Magasin de Zoologie,' de M. Guerin (F.);

Descriptions et Figures de *Melolontha spinipennis*, *Areoda maculata* et *Melolontha lactea*, (from the Revue Entomologique de Silbermann). Par M. Gory. All presented by M. Hippolyte Gory, of Paris.

Mémoire sur les Raphidiens;

Note sur la Larve du *Myrmeleon libelluloides*, et Descriptions et

Figures de *Derbe pallida* et *hæmorrhordalis*, et *Cephalelus infumatus*, from the 'Magasin de Zoologie.' All presented by M. Percheron, of Paris, the Author thereof.

Description du genre Pierates. Par M. Audinet Serville. Presented by the Author.

Descriptions and Figures of new Exotic species of Coleoptera, from the Transactions of the Zoological Society. By the Rev. F. W. Hope; and Zetterstedt, Orthoptera Sueciæ. Both presented by Mr. Hope.

Descriptions et Figures de *Paussus cornutus*, *Doryphora* 21-*punctata*, *Pericalus guttatus*, *Dryophilus anobioides*, *Meloe Olivierii*, from the 'Magasin de Zoologie'; and of *Sphindus Gyllenhallii*, *Monochamus bidentatus* and *Ynca irrorata*. From the 'Revue Entomologique.' Par M. Chevrolat. All presented by M. Chevrolat, of Paris.

Box of Specimens of Insects preserved in Amber. Presented by Dr. Berendt of Dantzig.

Number 64 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

Abstract of Ochsenheimer's European Lepidoptera. By J. G. Children, Esq.

Numerous species of Coleoptera from New Holland. Presented by J. G. Children, Esq.

Thirty species of Coleoptera, from Cambridgeshire. Presented by C. E. Broome, Esq.

Numerous Exotic Cimicidæ. By the Rev. F. W. Hope.

22 Exotic species of Coleoptera. By M. Chevrolat.

M. LEONARD GYLLENHALL of Sweden was elected one of the Honorary Foreign Members of the Society.

The Chevalier CARLO BASSI of Milan, was elected a Foreign Ordinary Member; and W. WILCOX, Esq., an Ordinary Member of the Society.

MEMOIRS, EXHIBITIONS, &c.

The following Report was read, relative to the various purchases of Insects made at the sale of the late Mr. Haworth's Collections:

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	N°. of Lots purchased.	N°. of specimens.	Price. £.	s.	d.
Coleoptera	51	1630	5	18	6
Diptera	14	585		11	6
Homoptera	1	40		1	0
Hymenoptera	2	100		2	0
Orthoptera	5	112		4	0
Lepidoptera	56	1328	5	4	6
	129	3795	12	1	6

	£.	s.	d.
Sum voted by the Society	10	0	0
Donation by Mr. Bennett	1	5	0
——— by W. Christy, Jun., Esq.	1	0	0
	12	5	0

The thanks of the Society were directed to be given to Messrs. Bennett and Christy for their donations.

The following Communications were then read :

Report of the Entomological Proceedings of the Royal Society, during the month of June, communicated by the Secretary, consisting of an elaborate memoir by Mr. George Newport, upon the internal analogy of the *Sphinx Ligustri*, illustrated by a multitude of figures; and a memoir upon the *Limnoria terebrans*, a minute but very destructive species of wood-louse, with a view of proving that this insect is indigenous in the Irish ports.

"Descriptions of various species of *Dromius*." By C. C. Babington, Esq., M.A., F.L.S., &c.

"On Coniortes, a new British genus of Neuroptera belonging to the Hemerobiidæ." By J. O. Westwood, F.L.S., &c.*.

"Description of a new genus of *Curculionidæ*, from Saint Helena." By M. Chevrolat, of Paris.

"Notes upon the genera *Acentria*, *Acentropus*, and *Zancle*." By J. O. Westwood, F.L.S.

The conclusion of Mr. Templeton's "Memoir upon the *Thysanuræ hibernicæ*."

Mr. Johnstone, of the Island of Grenada, who was present as a visitor, called the attention of the Meeting to the continued ravages of the *Delphax saccharivora* upon the canes of the West Indian Islands, and especially in Grenada, mentioning a variety of circumstances relative to the growth of the cane and the nature of the attacks of the fly; amongst which it was especially observed that the first appearance of the fly was preceded by a violent hurricane; that some of the neighbouring islands were perfectly free; that the richest and most fertile parts of the Island were more particularly ravaged by the insect, which had destroyed in some instances not less than two fifths of the entire crops; that the eggs are deposited in the mid rib on the under side of those leaves which had attained a considerable size; but that far greater damage was done to the young and tender plants which had not reached more than a foot in height.

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* Since this memoir was read this genus has been published by Mr. Curtis, in his 'Illustrations of British Entomology,' (Pl. 528. Dec. 1834.) under the name of *Coniopteryx*, and is placed in the family *Psocidæ*.

A discussion took place amongst the members present upon this subject, when it was ultimately resolved to form a committee for taking into consideration the most advisable means of checking the progress of the ravages of this insect, which committee was accordingly, on the motion of J. G. Children, Esq., appointed, consisting of the following members, viz., Mr. Spence, Mr. Hope, Mr. Stephens, Mr. Yarrell, Mr. Waterhouse, Mr. Shuckard, and Mr. Westwood, with powers to add to their numbers.

August 4*th*, 1834.

Lieut.-Col. W. H. Sykes, V.P., in the Chair.

DONATION.

Bericht über eine auf *Madagascar* veranstalte Sammlung von Insekten aus der Ordnung *Coleoptera*, von Dr. Fr. Klug. Presented by the Author.

Count C. G. DE MANNERHEIM was elected a Foreign Ordinary Member, and Wm. SELLS, Esq., of Kingston-upon-Thames, an Ordinary Member of the Society.

MEMOIRS, EXHIBITIONS, &c.

The Report of the Committee appointed at the last Meeting to investigate the ravages of the Cane-fly in Grenada was read, containing a variety of suggestions, 1st, of a purely agricultural nature; 2nd, with reference to the destruction of the unhatched eggs of the fly; 3rd, relating to the destruction of the active insect by solutions and other applications; and 4th, respecting the most advisable manner of catching the insects in the greatest profusion. It was resolved that this report should be received by the Society; but that its publication should be delayed until the result of the suggestions contained in it had been received from the Agricultural Society of Grenada, to whom a copy of it had been transmitted.

Mr. Ingpen exhibited the nest of *Odynerus quadratus*, which had been discovered between the folds of a piece of paper which had fallen behind some books. It was nearly six inches long and one wide, having several openings to the cells, through which the insects, on arriving at the perfect state, had escaped. It appeared to be composed of dried mud.

"Descriptions of some new species of Indian Ants, with Observations upon their Habits." By Lieut.-Col. W. H. Sykes, F.R.S., &c.

"Description of *Lamia Norrisii*, a new species of Longicorn Beetle." By J. O. Westwood.

Some observations were made upon the facts mentioned in Lieut.-Col. Sykes's Memoir; Mr. Hope considering it questionable whether cow-dung was the substance employed in the construction of the nest of the *Myrmica Kirbii*, and suggesting that it might rather be a papyraceous substance, similar to that employed by wasps. He also considered that the assertion of Gould, that ants do not lay up stores, was fully refuted, at least as far as regards the Indian species, by the *Atta providens*; and added that, owing to the difference in climate and other circumstances, the ants in warm countries would necessarily require stores for their supply during the rainy season; which circumstance was considered as sufficiently corroborated by the fact that ants in warm climates do not hybernate.

September 1*st*, 1834.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

Annales de la Société Entomologique de France, Nos. 1 and 2, for 1834. Presented by that Society.

No. 65 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author.

Descriptions of various genera of Parasitic Hymenoptera, from the Annals of Philosophy. By J. O. Westwood, the Author.

37 Species of the genus Aphidius, described in the Entomological Magazine. By A. H. Haliday, Esq., M.A., the Author of the Memoir in which they are described.

The First Part of Mr. Peale's 'Lepidoptera Americana,' 4to, with Plates, was also upon the table.

M. AUGUSTUS CHEVROLAT of Paris, M. F. E. GUE'RIN of Paris, and M. HIPPOLYTE GORY of Paris, were elected Foreign Ordinary Members; and Sigismund Rucker, Esq., of West Hill, Wandsworth, and J. Mills, Esq., F.L.S., of Durham, were elected Ordinary Members.

Memoirs, Exhibitions, &c.

"Monograph on Mimela, a genus of Lamellicorn Beetles." By the Rev. F. W. Hope, M.A., F.R.S., &c.

"On the Modern Systems of Nomenclature in Natural History." By J. O. Westwood.

The President exhibited numerous specimens of the *Cicada septendecem* of North America, in the various states of egg, larva, pupa, and imago; and, by his permission, an extract from a Letter which he had received from Dr. Harlan, of Philadelphia, was read; from which it appeared that the larvæ reside under ground, although the eggs are deposited in slits which the parent flies make with their ovipositors in the twigs of trees. On making their escape from the earth they are greedily feasted upon by birds, and it had been noticed that chickens eating them deposited eggs with colourless yolks; their septendecenary appearance was also confirmed by the writer*.

October 6*th*, 1834.

J. G. Children, Esq., President, in the Chair.

Donations.

Sugli Insetti più nocivi alla Agricoltura; and

Sui Bruchi che danneggiano gli alberi dei viale attorno Torino. Both presented by Professor Guiseppe Gené, of Turin, the author.

Report of the Committee of the Doncaster Agricultural Association on the Turnip-fly, and the means of its Prevention. Presented by that Association.

No. 66 of Illustrations of British Entomology. Presented by Mr. Stephens.

Notice of the Habits of the Onion-fly, from the Magazine of Natural History. Presented by J. O. Westwood, the Author thereof.

One Hundred species of British Lepidoptera. By Mr. Edward Doubleday.

Various species of British Coleoptera. By Thos. Marshall, Esq.

Mygale nidulans, from Jamaica, and a very fine specimen of its nest. By Wm. Sells, Esq., M.E.S.

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* See Brewster's Edinburgh Journal of Science, vol. ix. for 1828, for an interesting and more detailed account of the habits of this species.

J. C. Johnstone, Esq., of the Island of Jamaica, was elected an Ordinary Member of the Society.

Memoirs, Exhibitions, &c.

The President exhibited perfect insects and eggs of the *Cicada septendecem*, the latter of which, in the interior of the twig, were not discernible at the preceding Meeting of the Society, when this subject was brought under the notice of the Members. The President also exhibited various new and interesting species of exotic insects, including a fine and curious Moth from New Holland (*Chelepteryx Collesi*).

Report of the Entomological Proceedings at the Meeting of the British Association for the Advancement of Science, held at Edinburgh in September, 1834. Communicated by the Secretary. They consisted of—

1. Observations by Mr. James Wilson, the author of the 'Entomol. Edinensis,' upon a collection of insects obtained in an excursion to the north-west of Sutherlandshire, undertaken in June, 1834, by Sir William Jardine, Mr. Selby, and Mr. James Wilson.

2. Observations upon a collection of insects recently received from Java, by Mr. James Wilson. In this collection were contained numerous specimens of *Mormolyce*; also a singular genus of Orthopterous insects, in which the lower wings are fully developed, whilst the upper are totally wanting, (*Perlamorpha*, Curt.).

3. A short note upon the Transformations of the Crustacea, by J. O. Westwood, F.L.S., in which the author mentioned various circumstances sufficiently disproving the theory of *general* metamorphosis in these animals, as asserted by Mr. Thompson in his 'Zoological Researches.'

4. Although not forming a separate memoir, may be mentioned the statements contained in Sir Charles Bell's 'Lecture on the Nervous System' of the discoveries made by that gentleman's assistant, Mr. Newport, of the spinal marrow of the lobster, and a medullary tract of spinal marrow in the *Sphinx Ligustri*, from which nerves were distinctly traced, extending to the respiratory organs of that animal.

Also, Report of the Entomological Proceedings at the Zoological Society. Communicated by the Secretary. At the Meeting of the 24th of June, 1834, a Letter was read from Keith E. Abbott, Esq., to the Secretary, dated from Trebizond, accompanied by some poisonous honey, stating that the account given by Xenophon of the existence of this deleterious honey, and of its effects upon the Greeks, as related by that author, during their celebrated retreat after the death of the younger Cyrus; which, although it did not operate fatally, rendered those of the soldiers who ate but little, like drunken men, and those who ate much, like mad men, or dying persons; and numbers lay upon the ground as if there had been a defeat.

Another Paper by Dr. Hancock was also read, upon the Luminosity of the *Fulgoræ*; in which the writer concurs with M. Richard and M. Sieber in regarding as erroneous the statement of Madame Merian, that the *Fulgora laternaria* of Linnæus exhibits at night a brilliant light; and remarks that the whole of the native tribes of Guiana agree in treating this story as fabulous. It seems, indeed, to be an invention of Europeans, desirous of assigning a use to the singular diaphanous projection, resembling a horn-lantern, in front of the head of the insect. He also states that the *Fulgoræ* rarely sing. The insect whose song is most frequently heard in Guiana is the *Cicada clarisona*, the Aria Aria of the Indians, and Razor-grinder of the colonists. In the cool shades of the forests it may be heard at almost every hour of the day; but in George-town its song commences as the sun disappears below the horizon. At George-town this *Cicada* was never heard in 1804, when Dr. Hancock first visited the place, but it is now very common, probably in consequence of the shelter afforded by the growth of many trees and shrubs in the gardens which have since been formed there. The sound emitted by it is a long continuous shrill tone, which might be compared almost to that of a clarionet, and is little interrupted except occasionally by some vibrating undulations.

"Descriptions of some new species of Coleopterous Insects from Monte Video." By S. S. Saunders, Esq., M.E.S.

"On the Earwig." By J. O. Westwood.

A discussion ensued relative to the recent swarms of Ants, which had appeared in such numbers in some parts of the metropolis as to be commented upon in the daily papers. It was stated that coffee-grounds strewed about had been recommended as a remedy. Also that the insects had in one instance been traced to a piece of American pine wood, newly laid down in a kitchen; whilst in another instance they had established themselves in the crevices of a wall near to a fireplace.

November 3rd, 1834.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

Synonymia Insectorum, Genera et Species Curculionidum, vol. ii. p. 2. By. C. J. Schönherr, Honorary Foreign Member of the Society. Presented by the Author.

No. 67 of Illustrations of British Entomology. By J. F. Stephens, Esq.

Some Account of two Cases of Inflammatory Tumour, produced by the Deposit of the Larva of a large Fly (*Œstrus humanus*) beneath the Cutis in the Human Subject, accompanied with Drawings of the Larva. By John Howship, Esq. Presented by John Curtis, Esq., F.L.S.

Mémoire sur le genre Leucothyreus de MacLeay, et de ses Affinités. By the Author, J. O. Westwood, F.L.S., &c.

Drawing of the Larva of *Deilephila Euphorbiæ*. Presented by W. Raddon, Esq., with a Specimen of the Larva preserved in spirits; together with the Female *Termes,* and some other Larvæ preserved in spirits.

MEMOIRS, EXHIBITIONS, &c.

The same gentleman exhibited the living chrysalis of the *Deilephila Euphorbiæ,* the larva having gone into that state on the 10th of October; he also exhibited other drawings of the same insect in its various states.

A Letter was read from J. C. Johnstone, Esq., acknowledging the receipt of the Report of the Committee on the *Delphax saccharivora* by the Agricultural Association of Grenada.

The following Memoirs were read:

"Remarks upon innumerable Quantities of the dead Bodies of the *Galeruca Tanaceti,* observed at Cleathorpe, on the coast of Lincolnshire." By W. W. Saunders, Esq., F.L.S., &c. In this memoir it was stated that the appearance of innumerable dead beetles lying along the high-water mark on the coast was preceded by a violent gale from the east. They lay in heaps among the sea-weed, and this appearance extended for about 1500 paces. The opposite shore is the Spurn Point, too narrow and barren, it was supposed, to produce such flights. The *Galeruca Tanaceti* had never been previously observed in the neighbourhood of Cleathorpe. Hence Mr. Saunders is disposed to consider that they were driven over to our shores from the opposite coast of Holland or the Netherlands. Mr. Saunders also mentioned a somewhat analogous instance observed by himself near

Calcutta, where, in a paddy-field, he observed several purple patches, which on examination proved to consist of innumerable quantities of a small purple species of beetle allied to *Galeruca*.

"On the Tarsi of Insects, with reference to the superiority of the Tarsal System in the Coleoptera." By J. O. Westwood, F.L.S., &c.

"Observations on the Ravages of *Limnoria terebrans*, with the suggestion of a Preventative against the same." By the Rev. F.W. Hope. Specimens of the wood in its eaten state, and of the insects, were exhibited by the author.

Mr. Westwood communicated an extract from a Letter containing an account of the injuries committed upon barley and turnips by several species of insects, which were exhibited, belonging to the genera *Chænon* and *Eucoila*, as well as the indurated cocoon and pupa of a Dipterous insect, which, it was feared, might prove to be that of the *Musca Frit*, Linn., a species exceedingly injurious to barley in Sweden.

Mr. R. H. Lewis, M.E.S., who had recently returned from a tour in North America, exhibited a living specimen of *Cetonia Indæ*, captured by himself in the interior of that continent, and which he had preserved alive two months without food. He also exhibited a specimen of *Gymnopleurus volvens*, captured at the same time, but which had died since its arrival in Ireland.

It was stated by Mr. Stephens that *Galeruca Tanaceti* had this year abounded in the north of England; and that it had likewise occurred in great numbers along the coast.

Various suggestions were made by different members present for the institution of experiments to prevent the attacks of the *Limnoria*; and it was proposed by Mr. Yarrell (notwithstanding the statement made by Mr. Children, that insects immersed in a solution of corrosive sublimate will revive, after remaining immersed therein for at least twenty minutes,) that the saturation of piles, &c., in such solution might, by the formation of a new compound formed by the action of the corrosive sublimate upon the wood, have the effect of preventing the attacks of insects, as well as the not less injurious attacks of the dry-rot or other vegetable causes of decay.

With reference to Mr. Westwood's Memoir upon the tarsal system, the recent observations of MM. Solier, Chevrolat, Delaporte, &c., were noticed in support of the existence of five joints in the tarsi of the supposed tetramerous beetles, as well as the new classification of the longicorn beetles amongst the *Pentamera*, notwithstanding the evident identity in the structure of their tarsi and those of the *Curculionidæ* and *Chrysomelidæ*.

December 1*st*, 1834.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

No. 68 of Illustrations of British Entomology. By J. F. Stephens, Esq.

Description and Figure of *Trochalonota badia*. By J. O. Westwood.

MEMOIRS, EXHIBITIONS, &c.

A Letter was read from J. C. Johnstone, Esq., M.E.S., containing an extract from a communication received by him from Mr. Stokes, President of the Agricultural Society of Grenada, announcing the appointment of a Committee of that Society, for carrying into effect the suggestions contained in the Report of the Committee appointed by the Entomological Society upon the Cane-fly.

A Letter was read from Mr. Edward C. Herrick, of Newhaven, Connecticut, dated October 8th, 1834, addressed to W. Spence, Esq., (by whom it was communicated to the Meeting,) relative to the attacks of the Hessian-fly of North America upon corn, and of its parasites; and giving an account of the recent progress of Entomology in the United States.

A Letter was read from Dr. Klug of Berlin, returning thanks for his election as Honorary Foreign Member of the Society.

The Sixth Volume of the Transactions of the Academy of Natural History of Moscow, and Bouche's Natural History of the Preparatory States of numerous Insects," were laid upon the table.

The following Memoirs were read:

" Observations upon the Organization of the Mouth of the *Anthophora retusa*, and upon the Nature of the Parasitic Connexion existing between the working and parasite Bees." By J. O. Westwood, by whom numerous figures, illustrating the parts of the mouth in different degrees of protrusion, were exhibited.

"Observations upon Silk and Silk-producing Insects." By the Rev. F. W. Hope, F.R.S., &c., by whom an extensive and beautiful series of the exotic species of Silk-moths, from his own and the collection of J. G. Children, Esq., was exhibited, as well as a very large and fine specimen of the branch of a tree covered with the cocoons of another exotic Silk-moth, from the collection of the Naval and Military Museum.

Two remarkable cocoons of another large moth from South America (which were at first regarded as the nests of a large spider,) were presented to the Society by Mr. H. Cumming.

In the discussion which ensued, the value of Mr. Hope's suggestions were admitted, and various observations were made as to the practicability of carrying them into effect, and as to the particular species of insect which would be most serviceable for experiment.

With reference to the Memoir upon the mouth of the Bee, a discussion took place between Mr. Shuckard and the author; the former alleging that the statements therein contained were destitute of novelty; whilst Mr. Westwood stated that neither in the works of Latreille, Kirby, Reaumur, nor any other author which he had consulted, had the curious apparatus described by him for throwing out the labium to its fullest extent from within the extremity of the tubular mentum, been noticed.

January 5th, 1835.

J. G. Children, Esq., President, in the Chair.

DONATIONS.

Some Account of the Kolisurra Silk-worm of the Deccan. By Lieut.-Col. W. H. Sykes, V.P. Presented by the Author.

Revue Entomologique de Silbermann, No. 5. By the Rev. F. W. Hope.

No. 69 of Illustrations of British Entomology. By J. F. Stephens, Esq.

57 Proof Impressions of Plates of Insects from Guérin's 'Iconographie du Règne Animal,' published by Mr. Griffiths. Presented by J. O. Westwood.

The Nest of *Eucheira socialis*, described in the First Part of the Transactions of this Society. Presented by O. Rees, Esq.

EDWARD HORNER, Esq., of Grove Hill, Camberwell, was elected a Member of the Society.

MEMOIRS, EXHIBITIONS, &c.

Mr. Samuel Hanson exhibited an undescribed and curious Lamellicorn Beetle, which he had received from Syrmna, allied to *Scarabæus longimanus*.

Mr. Hope exhibited, by permission from the United Service Museum, a gigantic species of *Iulus*, and the pupa and imago of a large cornuted *Scarabæus* from Ceylon.

Mr. Westwood stated that he had recently discovered the rare *Platydema bicolor*, Fab., (*Diaperis ænea* of English authors,) under the rotten bark of a post at Chiswick, in considerable numbers, in company with its larvæ, drawings of which were exhibited.

Report of the Proceedings relative to Entomology at the Linnæan and Zoological Societies. Communicated by the Secretary.

Linnæan Society, *November 3rd*, 1834.—Read a Supplementary Paper upon some additional species of *Diopsis*, by J. O. Westwood. Amongst the numerous Donations of Books, the following relative to Entomology were especially worthy of notice: namely, The 'Transactions of the Royal Academy of Sciences of Berlin for 1832;' containing Dr. Klug's Memoir upon Madagascar *Coleoptera*. The 'Transactions of the American Philosophical Society,' vol. 4; including a Memoir entitled, Descriptions of some new North American Insects, and observations on some already described by the late Thomas Say. This valuable Memoir is confined to the *Coleoptera*, in which many new species are described, and six new genera added; amongst which that of *Amblycheila*, formed for the reception of the *Manticora cylindriformis* of Say, is the most interesting. The 'Transactions of the Royal Asiatic Society,' vol. 3; containing a Memoir by Lieut.-Col. Sykes upon the Kolisurra Silk-worm of the Deccan, and the concluding part of Dr. Perty's Descriptions of the Brazilian Insects, collected by Martius and Spix, with interesting observations upon the Economy of Brazilian Insects in general by Dr. Spix.

December 2nd.—Read the description of a very remarkable Arachnideous animal from Brazil, forming the type of a new genus in the family of *Phalangiidæ*, distinguished by the immense length of its legs, whence its generic name *Dolichoscelis*. It is dedicated to the late Mr. Haworth, from whose collection it was obtained. By the Rev. F. W. Hope, F.R.S., &c. Also read the first portion of a paper containing the descriptions of the insects captured along the coast of South America during the late expedition of Captain P. P. King; by Messrs. Curtis, Walker, and Haliday. In this first portion the *Hymenoptera* were described by Mr. Haliday; being about fifty in number, nearly half of which were considered as new, including two new genera, *Trachybates* amongst the aberrant Ichneumonidæ, and *Harpagon* amongst the *Pompilidæ*. The arrangement of the groups appears to be founded upon the views contained in the 'Horæ Entomologicæ.'

December 16.—At this Meeting the only Entomological subject to be noticed was the presentation of the third vol. of the 'Transactions of the Imperial Academy of Sciences of St. Petersburg,' containing two valuable Memoirs upon Cochineal, and Cochineal insects, by Messrs. Hamel and Brandt.

Zoological Society, *November 25th* and *December 9th*.—At these Meetings an extended Memoir upon the Organization of the genus *Nycteribia*, parasitic upon bats, containing also descriptions of ten species, by J. O. Westwood, F.L.S., &c., was read.

The following Communications were also read.

A Letter from Mr. J. V. Thompson, F.L.S., of Cork, was read, containing "Observations upon the Transformations of the *Crustacea* and *Cirripeda*," with the description and figure of the larva of *Lepas anatifera*.

"Observations upon the habits of *Copris Midas*, with an account of the receptacles in which it is found during the pupa state, together with additional observations upon *Formica indefessa*." By Lieut.-Col. W. H. Sykes, F.R.S., &c., by whom the earthen balls in which the pupæ were found, and various specimens of the perfect insect were exhibited.

"Observations upon the Œconomy of the *Strepsiptera*, with the description of *Stylops Spencii*, a new British species." By C. Pickering, Esq., M.E.S., by whom this new species, together with the bee from whose body it had been extracted on the 25th of December last, as well as other living bees taken in company therewith, were exhibited.

Additional Observations upon the *Strepsiptera*. By J. O. Westwood; by whom numerous figures of these insects in different stages, as well as a variety of specimens of the genera *Stylops*, *Xenos*, and *Elenchus*, and of stylopized bees and wasps were exhibited.

A lengthened discussion took place upon the subject of the preceding Memoirs.

The Rev. F. W. Hope exhibited a drawing of the receptacle of the larva of a large East Indian *Copris*, from the collection of Mr. Royle, and also specimens of *Copris Bucephalus*, and other species; and the pupa and imago of a new and large exotic species of *Bolbocerus*.

The receptacles of the pupæ of the *Copris*, described by Lieut.-Col. Sykes, were regarded by several of the Members as the work of the parent insect for the preservation of the ball of dung in the midst of which the egg is deposited; but by others as the production of the larva itself after it had consumed its supply of food, and previous to its assuming the pupa state; and several species of *Sphinx* were mentioned, as affording analogous structures, by Mr. Stephens. The observations of Reaumur upon the proceedings of the larva of the *Cucullia scrophulariæ* were likewise alluded to. It was also suggested that these hollow balls might be formed by secretions of the larva previous to assuming the pupa state. It was, however, objected by Mr. Letts that the globular form of these receptacles must have been produced by rolling them along by the parent insect, as is the case with the *Gymnopleuri*, rather than that they should be thus symmetrically formed by the irregular-shaped larva, whilst, on the other hand, the perfectly oval cells of the *Andrenæ* then upon the table were instanced as supporting a contrary opinion.

Mr. Westwood made some observations in opposition to Mr. Thompson's assertion of a general metamorphosis throughout the *Crustacea*. And Lieut.-Colonel Sykes stated that he had found the Land Crabs in India several hundred miles inland, and had never observed them to make annual migrations to the shore, the vast Ghauts preventing such a journey. Mr. Sells also made a similar observation respecting the Black Crabs of the West Indies, which he had observed several thousand feet above the level of the ocean in the middle of the island of Jamaica.

Mr. Pickering's observations upon the Œconomy of the *Strepsiptera* called forth extended remarks from various Members, by some of whom it was suggested that it was in the midst of the pollen-paste in the cells of the bees that the eggs of the *Stylops* are deposited, and that the larvæ, when hatched, burrow into the larvæ of the bee; by others, that it was in the bee's eggs; by some, in the body of the larvæ of the bee; and by others, that they were deposited in flowers, from whence the bees, in search of pollen, might accidentally carry them into their cells. Mr. Pickering, in reply to the different observations made upon this subject, stated that his opinion that the eggs were deposited in the eggs of the bees remained unshaken, as it could only be during the short period previous to the closing of the cell, after it had been filled with pollen-paste, that the egg could possibly be introduced into the bee's nest. He, however, admitted that with respect to *Xenos* the case might be different, since the cells of the *Polistes* (in the bodies of which it is found,) are left open, in order that the gregarious wasps may the more readily feed their larvæ contained therein, and which would consequently render the deposition of the eggs of the *Xenos* within the larva of the wasp more probable. Relative to the genera of *Hymenoptera* attacked by the *Strepsiptera*, the Rev. F. W. Hope stated that M. Van Heyden of Dantzig had shown him specimens of two species of *Cerceris* infested by a distinct genus of this order. And Mr. Westwood read an extract from a Letter received by him from Robert Templeton, Esq., relating to the capture of *Elenchus tenuicornis*, K., in the nest of a *Bombus*.

The Rev. F. W. Hope, as Treasurer for the past year, laid his Accounts upon the table, and the six following Gentlemen were elected Auditors of the same, namely, Lieut.-Col. Sykes; Messrs. Stephens and **Yarrell** from the Council; and Messrs. S. S. **Saunders**, **Sells**, and **Bennett** from the Society.

Anniversary Meeting, January 26th, 1835.

J. G. **Children**, Esq., President, in the Chair.

In pursuance of the By-Laws, the four following gentlemen were removed from the Council:

Thomas Bell, Esq.	Dr. **Roget**, Sec. R.S.
George R. **Gray**, Esq.	**George** R. **Waterhouse**, Esq.

and the four following gentlemen elected into the Council in their stead:

Dr. **Horsfield**.	**Wm. Longman**, Jun., Esq.
Wm. Christy, jun., Esq.	**Charles Pickering**, Esq.

And the following gentlemen were elected as Officers for the ensuing year:

President	The Rev. F. W. **Hope**.
Treasurer	W. **Yarrell**, Esq.
Curator	**Charles Pickering**, Esq.
Secretary	J. O. **Westwood**.
Foreign Secretary	W. B. **Spence**, Esq.

Mr. Yarrell, on behalf of the Auditors of the Treasurer's Accounts, read a favourable Report of the Accounts and Finances of the Society, which was unanimously adopted by the Meeting.

J. G. Children, Esq., read an Address on leaving the Chair, congratulating the Society on the rapid progress of Entomology, the flourishing state of the Society, and upon the favourable Report just received*.

The Secretary, at the request of the President, read a Report of the recent progress and present state of Entomology†.

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* This Address has since been published by Mr. Children for distribution amongst the Members. Copies of it may be had at the Society's Rooms.

† This Report has been printed for distribution amongst the Members of the Society, and for sale to the public. It may be obtained by the former at the Society's Rooms, and by the latter at either of the Society's publishers.

February 2*nd*, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Annales de la Société Entomologique de France, 3 tom. 3 trimestre. Presented by that Society.

No. 70 of Illustrations of British Entomology. By J. F. Stephens, Esq.

An abstract of the Indigenous Lepidoptera contained in Hübner's Verzeichness. Presented by Mr. Stephens.

No. 1 of a Manual of Entomology, from the German of Dr. Burmeester. By W. E. Shuckard, Esq., the Translator thereof.

Synopsis of the Family Phasmidæ. By G. R. Gray, Esq., M.E.S., the Author thereof.

Monographie du genre Diaperis. Par Messrs. Laporte et Brullé;

Mémoire sur cinquante espèces nouvelles d'Insectes;

Etudes Entomologiques, 1me livraison;

Revision du genre Lampyre;

Mémoire sur quelques nouveaux genres de l'ordre des Homoptères;

Notice sur un nouveau genre des Charançons (*Gasterocercus*);

Notice sur un nouveau genre de l'ordre des Homoptères (*Heteronotus*);

Descriptions et Figures des genres *Calicnemis*, *Stenocheila*, et *Trochalus*.

All presented by M. Le Comte de Castelneau, of Paris, Foreign Member of the Society, the Author thereof.

Monographie du genre *Notiophygus*. Presented by M. Gory, the Author thereof.

2nd Fascicle of the 'Coléoptères du Mexique.' Presented by M. Chevrolat, the Author thereof.

A Collection of Insects from Nova Scotia, with Manuscript Observations upon their respective Habits. By Mr. S. Woods, Jun.

MEMOIRS, EXHIBITIONS, &c.

The President read an Address nominating Messrs. CHILDREN, STEPHENS, YARRELL and Lieut.-Col. SYKES, to act as Vice-Presidents during the ensuing year*.

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* This Address has been published by the President for distribution amongst the Members, and may be procured on application at the Society's Rooms.

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Lieut-Col. Sykes exhibited a specimen of the Land Crab of the Deccan, and made some observations upon its Habits.

The Secretary, on behalf of Mr. Waterhouse, exhibited a Collection of rare exotic Coleoptera, selected from the cabinet of the President, with a view to illustrate some of the analogies existing amongst various groups of beetles.

The Secretary exhibited several new British species of Decapod Crustacea, collected on the Southern Coast near Hastings by Mr. Hailstone, upon which he made some remarks.

The President exhibited, by permission from the United Service Museum, three new Coleopterous insects from New South Wales, belonging to the genera *Chlænius*, *Lamia*, and to a new genus allied to *Hispa*; also a large species of *Scarabæus* from Sierra Leone, and two specimens of a gigantic larva of the family *Lampyridæ*; also a beautiful specimen of the nest of *Vespa Britannica* taken from a fir-tree near Durham; and a drawing of a crustaceous animal taken from the mouth of a whale, which appeared to be allied to *Cymothoa Œstrum*.

Mr. Pickering made some observations on the Coleoptera exhibited by the President, and gave a description of the *Lamia*, which he proposed to name (in honour of Lieut.-Col. Despard, by whom it was collected,) *Lamia Despardi*.

Read, "A Monograph upon the genus *Castnia*." By G. R. Gray, Esq., which was illustrated by the exhibition of a beautiful and extensive series of species from the Collection of Mrs. Children.

"Memoir upon the Habits of the Pomegranate Butterfly of the East Indies." By J. O. Westwood, F.L.S., &c., by whom the insects and their nests were exhibited.

Mr. Ingpen communicated an extract from Miller's 'Gardener's Dictionary,' relative to the planting of the canes in sugar-cane plantations sufficiently apart, so as to prevent injury from the attacks of insects.

A discussion upon the various subjects brought forward during the evening took place.

The Secretary gave notice that the Council had determined to extend the period for receiving the Prize Essays upon the Turnip-fly until the Anniversary Meeting in January, 1836.

JOURNAL OF PROCEEDINGS.

(Continued.)

March 2*nd*, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

SYNONYMIA Insectorum, Curculionidæ, Vol. 1 and 2. By J. C. Schönherr, For. Hon. Member of the Society, the Author thereof.

Recherches pour servir à l'Histoire et à l'Anatomie des Phryganides. Par M. F. J. Pictet, the Author thereof.

Monographie du Genre Phyllosome. By M. F. E. Guérin, For. M.E.S., the Author thereof.

Grammar of Entomology. By Edward Newman. Presented by Sam. Hanson, Esq.

Zoological Researches and Illustrations, Nos. 1 to 5:

Memoir upon the Pentacrinus. Both by J. V. Thompson, Esq., of Cork, the Author thereof.

Illustrations of British Entomology, No. 71:

Abstract of Hübner's Verzeichniss, &c. Both by J. F. Stephens, Esq., the Author thereof.

Manual of Entomology, from the German of Dr. H. Burmeister. By W. E. Shuckard, Esq., the Translator thereof.

Natural History of British Fishes, No. 1. By W. Yarrell, Esq., the Author thereof.

The Analyst, No. 7. By the Conductor.

The Rev. JOHN STREATFIELD, M.A. of Margate,

WILLIAM OGILVY, Esq., Barrister-at-law, F.L.S., Z.S., &c., of Gower Street,

were elected Members of the Society; and

M. LE COMTE DE CASTELNEAU, of Paris,

a Foreign Ordinary Member.

EXHIBITIONS, MEMOIRS, &c.

The Secretary exhibited specimens of a Lepidopterous Larva belonging to the family *Noctuidæ*, found to be injurious in shrubberies by gnawing entirely round the stems of lilacs and other plants, at a short distance below the surface of the ground. Also a drawing of the larva of one of the *Staphylinidæ*, which feeds upon turnips, giving them what is termed a grubbed appearance.

He also exhibited a series of specimens illustrative of the gradual development of a new species of the crustaceous genus *Porcellana*, discovered on the coast of Hastings by W. Hailstone, junior, Esq., some of which were scarcely larger than a good-sized pin's head.

The following Memoirs were read:

"Remarks on some mechanical peculiarities noticed in a Spider's Web at Wandsworth." By W. W. Saunders, Esq., F.L.S., &c. (See p. 127.)

"Description of *Chelepteryx Collesi*." By G. R. Gray, Esq., M.E.S., (see p. 121,) who exhibited specimens of the insect from the collection of Mrs. Children.

"On the agency of Insects in causing Sterility in Flowers by the removal of the masculine organs, observed amongst the *Asclepiadeæ*." By M. Ch. Morren, communicated by M. Emilien De Wael, and extracted from the 'Horticulteur Belge.'

In this Memoir the author details a series of observations, proving the generally received opinion that insects are ordinarily serviceable whilst collecting the nectar of flowers, in causing their impregnation by transporting the pollen from an anther to a pistil, (a fact also observed by Labillardiere in the humming-birds,) is not without exception. He first cites an observation of Plenck (Physiol. des Plantes, 1802, 8vo, p. 206), that one of the causes of sterility in plants is produced by insects devouring the flower, or by the eggs being deposited in the pistils, the young larvæ finding their way into the fruit, and causing it to ripen sooner than the uninjured fruit, but at the same time to fall prematurely to the ground. He then shows, from remarks of Sennebier (Phys. Veget., vol. i. p. 335,) and Kœlruter, that flowers are provided with a supply of pollen far greater than is necessary to fecundate the flower; thus in each stamen of *Hibiscus syriacus* 4863 grains of pollen were found, whilst 50 or 60 will suffice to render the flower fertile, the remainder being scattered by the wind or devoured by insects. He next cites a passage from Huber (Trans. Linn. Soc. Lond., vol. vi.) concerning the gathering of pollen by bees on the hind legs, whilst it is the pollen which is found in their second stomach which serves for the support of themselves and their larvæ. The *Anthreni*, in like manner, by frequenting flowers, scatter the pollen which may accidently rest upon the pistil. The discovery of insects, however, bearing pollen, is of very rare occurrence, except in the case of the bees, a circumstance explained by the cleanliness of insects, and their constant habit of divesting themselves of extraneous particles. Having, however, during the months of July and August, captured many specimens of the *Pontiæ Brassicæ, Rapæ, Napi*, &c., he discovered that each had several appendages, from one to ten in number, attached to its tarsi, often in pairs, and which he subsequently ascertained from their structure to be the pollinific masses of the *Asclepiadeæ*, most probably of *A. linifolia, Lagasca*, of which he had many specimens in flower, and which he immediately examined, and was surprised to find the majority deprived of their pollinific masses. He then enters into a minute description of the curious flowers of the *Asclepias*, and proves that by means of the tarsi of the butterflies passing through the crevices of the nectaries and hooking upon the notched base of the pollen-masses, the latter are forced off and carried away by the butterflies. From these circumstances the author advises horticulturists who would wish to see their *Asclepiadeæ* covered with seed, to protect the plants whilst in flower from the approach of the butterflies.

"Descriptions of some new Exotic Dipterous Insects." By J. O. Westwood, F.L.S., &c. (These descriptions have subsequently been published by the author in the Philosophical Magazine.)

"A Description of the Superior Wing of the *Hymenoptera*." By W. E. Shuckard, Esq., M.E.S. (See p. 208.)

"Observations upon the Natural History of various Species of West India Insects." By W. Sells, Esq.

1. *Land Crabs.*—The author states that the land crabs of Jamaica are of two species, the white and the black, although regarded by some writers as varieties of *Cancer ruricola*. The black crab is common in the east and north of the island during a great portion of the year, principally in the vicinity of the coast. It is very active in its motions, and is esteemed a very great delicacy, being kept by some of the inhabitants in inclosures, where it is regularly fed with boiled Indian corn, or Guinea corn, (*Holcus Sorghum*,) upon which the crabs thrive well, and are thus ready at the shortest notice for the table*. The white land crab is common in the lowland districts on the south of the island; it is rather larger than the black crab, not so active, the body larger, and the legs shorter. After long-continued droughts succeeded by heavy rains, the crabs come out of their holes in the rocky soil in

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* Lewis, in his Journal of a Residence in Jamaica in 1816, after complaining of the eatables of the island, states, "For my own part I have for the last few weeks eaten nothing except black crabs, than which I never met with a more delicious article for the table." They are usually boiled, then picked and mixed with crumbs of bread and spices, and afterwards baked in the shell.

vast numbers, entering the houses. The weather being sultry on one occasion they found their way into the chamber of the writer, and attacked a dry goat-skin (used as a covering for a portmanteau). They are caught by boys, who dispose of them at Spanish Town at about one shilling per dozen ; they are fine eating, but decidedly inferior to the black crabs. They are in general night feeders, when the dew is on the ground, so that they are generally caught at night, by a man called the Crab-catcher in the different estates, who being well acquainted with their haunts, stops up their holes, and thus cuts off their retreats. When alarmed they move off briskly, but when overtaken stop and hold up their claws in a threatening position. Hogs are fond of them, and kill them by putting one of their feet upon the crab, and breaking the claws with their teeth ; sometimes, however, the crab is too quick, and seizes the hog by the nose. The crabs periodically cast their shells, and in the soft state are called leather-jackets, and being at that time very fat, and the whole mass eatable, are especially prized. The writer then notices the provision made for the construction of the new shells from the two masses of carbonate of lime found on each side of the stomach, immediately before each moulting; and concludes by observing that so numerous were the crab-holes in the ground close to the Rectory of the parish where he resided in Jamaica, that he once punningly told the clergyman that no stranger could approach his residence without being soon made sensible that he was treading upon *holy ground.*

2. *Elater noctilucus*, or fire-fly, as it is commonly termed by the natives, is very abundant in Jamaica, except in mountainous situations, where the cold is not congenial to it or the musquito. Its flight in the piazzas of the houses as soon as the evening closes in is described, and the light is described as being of a fiery orange colour, differing much from the mild blue silvery light of the glow-worm. They are occasionally made use of by the inhabitants as a substitute for lamps in the chambers, a few being confined together ; and it is stated that a lady, previous to her passage to England, placed a number of these insects in a wide-mouthed phial with some rotten wood, covering the mouth with gauze, and which served as a substitute for a lamp on board, by shaking the phial and disturbing the insects, which immediately sent forth an abundant light; they however perished when the ship arrived in northern and colder latitudes. The author opposes the statement of M. Laporte, (Ann. Soc. Ent. France, 1833, p. 123,) that the splendidly luminous spectacle exhibited in tropical countries by fire-flies is caused by *Lampyridæ* as well as *Elateridæ*, asserting that in Jamaica the appearance is produced exclusively by the latter, the light of the glowworm which

is occasionally seen being no more comparable to that of the *Elater* than a dying oil-lamp to a jet of pure gas.

3. *Scorpions.*—Instances are given by the writer of these creatures inflicting their stings in different situations: thus a lady was stung by one in the finger whilst in the act of putting on her glove, into which a scorpion had found its way. One of the writer's children was stung whilst putting on his boot, into which a scorpion had crawled. But the greatest number of scorpions which he ever encountered was on board a vessel in which he came home, which contained a great quantity of logwood, in the crevices of which these noxious creatures were concealed. During the voyage a child was stung on the upper part of the thigh, a scorpion having crept up his trowsers; the part wounded was directly rubbed with rum in which scorpions had been immersed, which is a favourite remedy with the sailors; and the writer had himself a narrow escape from a scorpion which had taken up its quarters on his pillow through the night. He considers however that the effects of the sting of a scorpion do not usually much exceed in severity that of a wasp.

Flies.—The writer states that in the course of his medical experience in Jamaica several distressing cases had occurred where flies had deposited their eggs in the human body, either in the mucous membrane lining the nose and mouth, in the passage of the ear, or in ulcerated parts. In one instance he picked out about fifty large larvæ from a neglected blister on the chest of a young gentleman who had fever with delirium; the dressings being displaced through restlessness, the blistered surface became exposed to the flies. Another case was that of a gentleman, who towards the close of a protracted and fatal illness had a number bred in the gums and inside the cheeks, and which continued to make their appearance until his decease. It is most probable that he had lain with his mouth open, and had thus allowed an entry to the parent flies. Another instance occurred in a young gentleman who fell asleep under a tree after bathing, when a fly deposited its eggs in his ear, causing severe suffering when the eggs were hatched, and before the larvæ were extracted. But the most extraordinary fact of this kind happened to an intelligent negro man, whose eyes, nose and cheeks, when first visited, were very much swollen, his face rendered quite hideous, and his sufferings severe. Suspecting the cause, the writer injected olive oil and green tobacco-juice up the nostrils, when the larvæ began to drop out, but the whole were not removed from the nasal passages in less than a fortnight. The man, at Mr. Sell's request, kept a tally of their numbers, and it appeared that not fewer than 235 larvæ (of, he believes, the bluebottle fly,) made their appearance.

It is however surprising, considering the number of flies which abound on the sugar estates, and how often the negroes sleep in the open air, that similar incidents do not occur more frequently.

The Cockroach.—This is the most annoying of the insect tribes in Jamaica, devouring leathern articles of all kinds which have been used, such as saddles, harness, gloves, boots and shoes, &c.; they devour the bindings of books after they have been handled, and any perspiration has adhered to them; they crawl over and eat fruit and vegetables, dropping their egg-cases, and leaving their fæces and an intolerable stench wherever they travel; they also eat the corks of bottled wine, cider, and porter, causing the liquid to escape; this may however be prevented by dipping the corks in a thick mixture of quick-lime and water, the latter being occasionally impregnated with the bitter of quassia. They harbour in empty bottles, which are rendered not only difficult to clean, but almost impossible to sweeten again. They also eagerly devour parchment, which material is consequently never used for wills, deeds, conveyances, or other legal documents, which the insects would very quickly destroy. They have a great dislike to castor oil, which is accordingly rubbed over boots, shoes, and other leather articles to protect them from their attacks.

6. *Black Spider.*—There is a spider in Jamaica the bite of which is venomous, being speedily followed by inflammation, with pain and swelling of the wounded part: the natives are consequently much afraid of it. It is of small size, the body not being larger than a small pea, with short legs. It is entirely black except a spot of bright scarlet upon the head, rendering it so conspicuous, and at the same time so repulsive, that a person unacquainted with its venomous properties would instinctively shrink from it; a peculiar and interesting provision of nature observed in many obnoxious animals, whereby, as St. Pierre and others have remarked, mankind are put on their guard against their attacks, from some peculiarity of form, colour, sound, or other disgusting quality.

7. *Silk-worm.*—The peculiar stationary habits of the silk-worm, and the sluggish nature of the moth, which can scarcely be said to possess the powers of flight, are here commented upon as interesting circumstances in connexion with the more easy management of the insect, thus beautifully harmonizing with its vast importance to mankind.

Mr. Stephens informed the meeting that, with respect to Mr. Saunders's communication, he had not unfrequently observed the suspension of stones in spiders' webs, and that in the course of last autumn he had seen three in one day in his garden at South Lambeth.

The name given by Mr. Gray to his new genus of Australian moths was objected to by several members as being too close to *Calepteryx*, a genus of dragon-flies, which led to some observations upon the employment of almost identical generic names in various groups of insects.

It was also stated, with reference to the Memoir of M. Morren, that several species of *Asclepiadeæ* were described as being fly-traps, and it was suggested that it was by greater energy that butterflies were not only enabled to extricate themselves from the flower, but also to drag off the pollinific masses themselves, and that as the genus *Asclepias* was chiefly North American, it was not uncommon to perceive, attached to the legs of various insects which frequent flowers, sent from that country, similar appendages to those observed by M. Morren on the feet of the butterflies.

The President observed, with respect to Mr. Sells's statement of the maggots obtained from the head of a black man, that oil would in all probability be found to be a serviceable remedy not only in such cases, but also in the attacks of the bots.

The following resolution (proposed by W. Sells, Esq., and seconded by W. E. Shuckard, Esq.) was unanimously adopted:

That it is considered by the members of the Entomological Society present at this meeting, that a short popular course of lectures upon Entomology would be highly desirable, and tend materially to the advancement of the science.

April 6th, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Jahrbucher der Entomologie. By Dr. F. Klug.

Encyclopédie Méthodique, Entomologie, 7 vols. 4to. Both Presented by the Rev. F. W. Hope, President.

Observations sur un Insecte qui passe une grande partie de sa vie sous la mer. By M. V. Audouin, Hon. For. Member of the Society, the Author thereof.

No. 72 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

Notice of the Ravages of Insects upon Barley and Turnips; by J. C. Farmer, Esq.: with additional Observations and Descriptions, by J. O. Westwood, F.L.S. Presented by the latter.

A series of Dissections of the genus *Anoplognathus*. By W. Sells, Esq.

Gorges Hely, Esq., of Johnstown, Ireland, was elected a member of the Society.

Exhibitions, Memoirs, &c.

William B. Pickering, Esq., exhibited the exuviæ of the pupa of *Bombylius major*, with the imago reared therefrom, having found the pupa in sandy gravel-pits at Coombe Wood on the 28th March, the fly being produced a few days afterwards.

" Remarks on the destruction of *Cocci*." By Mr. A. Ingpen, A.L.S., &c., (see p. 174) by whom a branch of a golden pippin apple, infested in a surprising degree by these insects, was exhibited, and which were at that time in the state of ova, covered by the dried bodies of the parent insect.

" Descriptions of some new exotic Dipterous Insects." By J. O. Westwood, F.L.S. (Subsequently published in the Philosophical Magazine.)

" Observations upon the Turnip Fly." By Mr. James Main, A.L.S.

" On the development of the Apodal Larvæ of the *Hymenoptera*, with reference to the segmental theory of the *Annulosa*." By J. O. Westwood.

Dr. Ure, F.R.S., &c., (who was present, as a visitor, at this meeting,) at the request of the President, gave an account of his recent investigation relative to the present state of the silk manufactories in this country. Referring, in the first place, to the great importance of the silk manufacture as a great commercial enterprise, he gave an account of the microscopic appearance of the raw material, each of the threads of which was stated to be composed of two distinct cylinders, which, in good silk, were found to be perfectly parallel and quite cylindrical, the unevenness or the want of parallelism producing inferiority in the raw article. Each of these cylinders was mentioned to vary in diameter from $\frac{1}{2200}$th part of an inch (the measure in silk of the best quality) to $\frac{1}{1800}$th of an inch. When imported, however, several distinct threads were found reeled together, which was done by the grower of the silk-worms, the threads being passed through several eyelets and then wound off. The imported raw silks were found to be of various qualities, which depended upon the mode and time of feeding as well as upon the food of the worms. These compound threads are $\frac{1}{300}$th part of an inch in diameter, each being divisible into eight threads; that is, into four pairs of cylinders in the best silk. The East Indian Comorolli silk was also mentioned as being of coarser texture, and as not being carefully reeled; here the compound thread was found to consist of sixteen cylinders, that is, eight double threads, and to be $\frac{3}{1000}$th part of an inch in diameter. The specific gravity of the silk was stated to be greater than had been generally considered, being 1250 to 1000, and consequently greater than the strongest muriatic acid or water.

Having inspected several of our silk manufactories wherein the most recent improvements in the machinery had been adopted, Dr. Ure stated that in respect to their machines, the English mills were far superior either to the French or Italian. The mode of winding the silk was then described: the exceedingly tender fibres are wound off by an apparatus called the swift, and which is moved simply by the friction caused by a large revolving wheel; and so essential is the nicety of the machinery, that the silk is obliged to be wound obliquely and then crossed in the opposite direction, in order to prevent the threads from falling between the threads of the preceding layer; at the same time the threads are cleansed by a machine termed the cleaner, a brass instrument with fine holes drilled through it, which allows the thread to pass if clean, but if there be dirt attached it causes the thread to break, when the parts are cleansed and reunited by children. The recently invented machinery was described, by which the threads were doubled, and which is kept in constant motion so long as the thread is entire, but which stops as soon as the thread is accidentally broken. Numerous drawings were exhibited representing these and other modern machinery upon the most approved principles, and which had been hitherto carefully concealed from public inspection by the proprietors.

The manner in which the different consistence of silk used for the lace-manufactory and for hosiery is produced was next explained, and which consists in the single thread of silk (in the former) being first twisted and then doubled, whilst in the latter the threads are first doubled and then twisted together, which is found to produce a softer material.

The silk produced in the South of France was stated to be of the best quality, the white mulberry growing there in the greatest luxuriance; the trees however do not thrive well to the north of Lyons.

The cocoons obtained from the produce of an ounce of eggs are averaged to weigh 100 pounds. And it had been ascertained that it was practicable nearly to double the quantity of silk obtained from the worms by giving them a double quantity of food: the worms however sometimes became sick and were removed to the "infirmary." Chloride of lime was constantly employed to keep the air in the rearing houses pure, as it was found that the worms were greatly injured by impurities, either in the air, their food, or their habitations.

A Letter was read, addressed to Mr. William Bennett by Mr. Charles C. Doggett, noticing the destructive ravages of a small coleopterous insect, apparently congenerous with *Lyctus oblongus*, upon the wickerwork of a cane box, received from Japan by Java (but not opened there). Some of the beetles which had been inclosed in a pill-box remained still alive. The box appeared perfect when unpacked in England, but in the course of three days it presented its present worm-eaten appearance.

The Rev. F. W. Hope communicated some observations upon a mode of proceeding adopted by C. Eyton, Esq., in Shropshire, which had proved very efficacious in preventing the ravages of the Hop-fly, (*Aphis Humuli*), and which consisted in charring the hop-poles before they were used. He stated that it had been frequently noticed that when the hop was bound to new poles the injury produced by the fly was greatly diminished; and he considered that it was evidently owing to the destruction of the parent flies, or the embryos, which passed the winter and spring upon the poles, that the plan now mentioned had proved so beneficial. He likewise suggested that by dipping the poles in the solution of corrosive sublimate, now so extensively employed, a like effect might also be produced.

A lengthened discussion then took place upon the preceding subjects, in which Messrs. Spence, Children, Sykes, Yarrell, Ogilby, and others joined.

Mr. Babington stated with respect to the ravages of the turnip flea (*Haltica nemorum*) that he had sought in vain for the larva of the insect upon the young turnip, and that it was evident that the mischief was the result of the attack of the perfect beetle alone.

Mr. Ogilby mentioned that he had been informed by Mr. Coke, the distinguished agriculturist of Norfolk, that the richest compost was the most serviceable in securing the turnips from the attacks of the beetle, as it forced the plants to a size beyond their powers of injury in the space of twenty-four hours. Experiments had likewise been made as to the relative effects of lime and manure, and it has been ascertained that in limed ground the plants were but little attacked, but that it was necessary to re-sow the manured ground.

Mr. Spence stated a curious circumstance which he had observed near Brussels, where hundreds of acres are employed in the cultivation of Brussels sprouts, and he had seen the *Halticæ* swarming to such an extent upon these plants that a pint could have been collected from two or three, and yet they did not materially injure the turnips which were planted between the rows.

The Rev. F. W. Hope mentioned some circumstances relative to the growth, &c. of silkworms, stating that it was essential that great regularity should be employed in the feeding of the worms at stated periods, the best-fed worms producing the best silk; moreover, that the silk from worms fed upon lettuce was not near so valuable as that when mulberry was used for food.

Colonel Sykes mentioned some experiments made by Signor Mutti, in India, upon the silkworms of the Deccan, whence it appeared that the older leaves were far more nutritious to the worms than the young ones.

May 4th, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Annales de la Société Entomologique de France, vol. iii. part 4. By that Society.

The Athenæum, parts 1 to 4, for 1835. By the Editor.

Handbuch der Entomologie, vol. ii. part 1. By Dr. H. Burmeister, the Author thereof.

No. 4 of The Manual of Entomology. By Mr. Shuckard.

Transactions of the Berwickshire Naturalists' Club. By that Society.

No. 73 of Illustrations of British Entomology. By Mr. Stephens.

Observations on the Natural History of two species of British Wasps. By the Rev. Edward Bigge, the Author thereof.

Three Memoirs in Italian upon *Thrips physapus*, the Larva of *Zabrus gibbus* and *Calathus latus*. By Signor Passerini, For. Hon. M.E.S., the Author thereof.

Descriptiones Generum nonnullorum novorum e Familiâ *Lucanidarum*, &c. By J. O. Westwood, the Author thereof.

Insectorum novorum exoticorum (ex Ordine *Dipterorum*) Descriptiones. By the same.

A Box, containing about 70 species of Insects from Tuscany. Presented by Signor Passerini.

ROBERT E. GRANT, M.D., Prof. Zool. in the University of London, &c.;

T. FORBES ROYLE, Esq., F.L.S., &c., of Berners Street;

T. J. PETTIGREW, Esq., F.R.S., &c., of Saville Row; and

ROBERT MAULKIN LINGWOOD, Esq., of Christ's College, Cambridge; were elected Members of the Society.

EXHIBITIONS, MEMOIRS, &c.

Colonel Sykes exhibited a quantity of eggs of the East Indian *Bombyx Paphia*, which had been deposited previous to the impregnation of the female, requesting information as to the mode in which eggs, thus evidently perfectly formed, were acted upon by the male semen, even whilst in the body of the female.

The Secretary exhibited a large collection of very minute insects, collected with a sweeping net in the island of Mauritius by Robert Templeton, Esq., in the course of the last summer and autumn, which, with two exceptions, appeared to belong to the common British forms.

The Secretary also exhibited a series of specimens of *Hydrometra Stagnorum*, fully grown as regarded their size, but varying in the absence, or greater or less development of the wings and wing-covers, and which he considered as fully proving the specific identity of these insects, which had been regarded as distinct species by Mr. Curtis in the 'Guide.' He also made some observations upon the occasional development of wings in these and other species which are generally found quite or partially destitute of these organs, and noticed the precise analogy which existed in this respect between the orders *Hemiptera* and *Orthoptera*.

The following Memoirs were read:

Notes upon the insects observed in unrolling a mummy at Belfast, in a letter addressed to the Secretary by Robert Patterson, Esq., Treas. Nat. Hist. Soc. Belfast, by whom also specimens of the insects were exhibited, consisting of a *Dermestes*, resembling *D. vulpinus*, and a *Necrobia*, resembling *N. violacea*, but differing in colour, and apparently identical with those described by Mr. Hope in the first part of these Transactions.

"Observations on the *Haliplus ferrugineus* of Authors." By C. C. Babington, Esq., M.A., F.L.S., &c. (See p. 175.)

"Notice of two Memoirs presented to the Society by Signor Passerini." Communicated by W. B. Spence, Esq., For. Sec.

In the first of these Memoirs Signor Passerini notices the ravages occasioned by larvæ, in the winter and spring of 1832–3, on the wheat in the provinces of Bologna, Romagna, and Ferrara, by devouring the cellular tissue of the leaves and stalks of the young plants, and thus causing them to perish: these attacks are made during the nighttime, the larvæ concealing themselves underground during the day. They had been ascertained by Professor J. Bertolini, of Bologna, to be the larvæ of *Zabrus gibbus* and *Calathus latus*, and appear to be equally injurious. Signor Passerini suggests the ploughing up of the land, and then turning in a flock of poultry, which would greedily pick up the larvæ.

The second Memoir relates to a species of *Thrips* (*T. physapus*, Linn.?), which causes great injury to the olives in the district of

Pietro Santo in Tuscany, and is considered as more detrimental than either *Coccus Oleæ* or the larvæ of *Tinea Oleella?* In April four or five of the eggs of the *Thrips* are attached to almost every bud of the branches of the olives, on the parenchyma of the young leaves of which the larvæ, when hatched, feed.

"Account of the Attacks of various Insects upon Wine-Corks." By S. S. Saunders, Esq., M.E.S.

The author states, that a friend having occasion to remove his stock of wine from one cellar to another, found the corks of many of the bottles injured, so that the wine had leaked, occasionally so much only remaining as was retained in the hollow of the bottles when lying down. The damage was confined to the bottles containing Shiraz (a Persian wine,) and some Hock, which had been twenty years in the cellar. The corks of these bottles, although placed apart, were injured, the intervening descriptions of wine being untouched. On examining the corks, four species of insects were found in them, *Mycetæa hirta*, *Cryptophagus cellaris*, a minute *Acarus*, and *Atropos lignarius*.

The *Acarus* was found in some abundance within the crevices of the corks of both wines, and one specimen, which the author observed undisturbed for a length of time under a microscope, appeared to be engaged in burrowing into the cork, for which purpose the recurved claw at the extremity of the anterior legs appears adapted. The *Atropos lignarius* was not in any great abundance, and was observed running about the outside of the corks, none being found within them. Of the *Cryptophagus cellaris* a single specimen was alone observed, among some corks which had been extracted and placed in a box during several months. A single specimen of *Mycetæa hirta* was likewise only observed, although in the account which Mr. Curtis has published of this genus (to which the author refers,) it is stated that they were found in considerable abundance, and were also accompanied by a minute *Acarus*; the damage to the corks being supposed by Mr. Curtis to be caused by the larvæ of a moth.

It was further mentioned, that the tops of the Hock corks were covered with a coating of wax; but as this did not extend down to the bottle, serving only as a mark, it was not serviceable in defending the corks against the attacks of the insects. No larvæ of any kind were observed in the corks. The author then questions the correctness of Mr. Curtis's suggestions as to the introduction of the *Mycetæa* into the cellar with hay and sawdust, in consequence of a circumstance mentioned in the original letters of Dr. Henderson to Mr. Curtis, coinciding in a singular manner with the observations of Mr. Saunders, namely, that the attacks noticed by Dr. Henderson were confined exclusively to Rhenish wines and the rare Shiraz, and consequently that it may be inferred that the *Mycetæa* has a peculiar taste for these kinds of wine. Kirby and Spence (Introduction, vol. i. p. 246,) mention the attack of white ants upon a pipe of fine old Madeira for the sake of the staves, which were probably strongly imbued with the wine, and perhaps thus rendered more agreeable to the taste of the *Termites*, and hence it is probable that the saturation of the corks by these two peculiar wines rendered them more palatable to the insects, whilst, for the same reason, the corks of the other wines remained untouched. Indeed the corks of a large stock of claret were injured, but only as far as that point where they remained free from all tincturing of the wine. These bottles were placed in the lowest range of bins in the cellars, and from the manner in which they were eaten, it appeared evident that the injury was caused by *Blattæ*, which, however, evidently did not relish the tincture of the claret, although they will attack almost everything, an instance of which is mentioned where they devoured the whole inside of a lemon after a thin slice of the peel had been taken off, leaving only the pips and fibrous particles untouched.

It was stated, in conclusion, that it was the intention of Mr. Saunders's friend to try the effect of successive fumigation of the cellar, by sulphur, for the purpose of destroying the insects which might still remain in the corks.

"Descriptions of *Elenchus Templetonii*, a new Strepsipterous Insect." By J. O. Westwood. (See p. 173.)

Mr. Thompson, of Belfast, who was present as a visitor, stated, that having been present at the unrolling of the mummy from which the insects exhibited at this meeting had been extracted, he had noticed that the chest and head, as well as the thigh, were found to be nearly filled with dead specimens of these insects; likewise that the external rolls of the mummy were entire, and that it was not until they approached the body that any insects were found between the folds, and in which part the bandages appeared to have holes in them, as though made by the insects.—Mr. Hope stated that the insects were evidently similar to those which he had described under the names of *Dermestes pollinetus* and *Necrobia Mumiarum*. (See p. xi.)

In reference to Mr. Saunders's paper, Colonel Sykes mentioned that the corks in his wine-cellar in London were, at the present time, attacked by the common cockroach, and that it appeared that the insects preferred the corks of those wines which contained most saccharine matter. In India the *Blattæ* had especially attacked the corks of his malmsey and Constantia wine-bottles.

Mr. Quickett, who was present as a visitor, mentioned that in

Somersetshire *Blaps mortisaga* attacked the corks of sweet currant-wine bottles.

Mr. Sells noticed that the *Blattæ* will also eat the corks in porter-bottles; and

Mr. Babington stated that he had found the larva (evidently that of a small Lepidopterous insect,) in the cork of a Port wine bottle, which it had completely eaten so as to cause the wine to escape; and that it had made a small case for itself of bits of cork.

Mr. Hope mentioned that in India it was well known that the *Blattæ* will not attack anything coated with resin animé, and which is accordingly employed as a defence against their attacks in covering the corks of bottles, &c.

With respect to the suggestions made by M. Passerini in one of his pamphlets, Mr. Sells stated that he had noticed in several instances that the farmers in the neighbourhood of Kingston-upon-Thames were in the habit of driving their ducks into the fields at the time of ploughing, the birds finding an acceptable repast in the great numbers of the larvæ of the cockchaffer which were turned up by the plough; and

Mr. Spence observed, that many years ago he had noticed that the same birds were employed to destroy the slugs in Norfolk in a similar manner.

With reference to the observations of the Secretary upon the geographical peculiarities exhibited by Mr. Templeton's collection of Mauritius insects, the President stated, that having turned his attention recently to this branch of entomological science, he was surprised at the little advance hitherto made therein, and mentioned that he had traced the range of several individual species for between three and four thousand miles.

The subject of the benefits likely to arise from the charring of hop-poles was again brought forward by the President, who stated that Mr. Eyton had informed him since the last meeting that charring the poles had the effect of making them more durable. Mr. Sells, however, considered that the poles would thereby be rendered brittle, which effect would not be produced by employing the solution of corrosive sublimate, which would moreover tend to their preservation. To which the President replied, that it had been found that the charred lamp-posts in the streets of London were much more durable than those not thus treated.

Mr. Ingpen noticed that the *Aphides* occasionally hybernate under ground, a fact of some importance with reference to the subject under discussion.

The President having exhibited a portion of the stomach of a horse greatly infested with bots, from the collection of Mr. Henderson, of Park Lane, veterinary surgeon, and directed the attention of the Members to the discovery of some available remedy, Dr. Blundell stated that he had been informed by the veterinary surgeons whilst travelling in Holland that the concentrated juice of savin and enema had been applied with great effect.

May 6th, 1835.

It having been resolved to celebrate the successful establishment of the Society by a Dinner, the same took place this day at the British Coffee House, in Cockspur-street, where the President of the Society (the Rev. F. W. Hope), supported on the right by the Honorary President (the Rev. W. Kirby), and on the left by W. Spence, Esq., together with Messrs. Children, Sykes, Yarrell, Vigors, Stephens, and a considerable number of the other Members of the Society, sat down to dinner; after which the usual and other appropriate toasts were drunk, and when the Honorary President, in returning thanks after his health had been drunk, announced his intention of presenting his entire collection of insects to the Society.

June 1st, 1835.

The Rev. F. W. Hope, President, in the Chair.

The President announced that their Royal Highnesses the Duchess of Kent and the Princess Victoria had been graciously pleased to become the Patronesses of the Society, and a Letter from Sir John Conroy was read to that effect.

The President also informed the Meeting, that at the Anniversary Dinner of the Society the Rev. W. Kirby, Honorary President, had announced his intention of presenting his entire collection of insects to the Society; at the same time taking occasion to make some observations upon the great benefit which must necessarily accrue to the Society from having such a standard collection in its possession.

Donations.

Suggestions for a Society for Promoting the Improvement of Public Taste in Architecture and Rural Scenery. By W. Spence, Esq., the Author thereof.

No. 74 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

Lettre à M. Serville sur le *Canopus obtectus*. By M. Alex. Lefebvre, Hon. For. M.E.S., the Author thereof.

Report on the Recent Progress and Present State of Zoology. By the Rev. Leonard Jenyns, M.A., F.L.S., &c., the Author thereof.

Descriptions of new or imperfectly known Parasitic *Crustacea*. By Dr. Hermann Burmeister, the Author thereof.

Coleoptera Europæa Dupleta in Collectione Villæ. By M. A. Villa, the Author thereof.

No. 5 of a Manual of Entomology. By W. Shuckard, the Author thereof.

A specimen of *Elenchus Templetonii*, from the Mauritius. By R. Templeton, Esq., R.A.

The Rev. J. Fleming, D.D., F.R.S.E., &c., of Aberdeen,
George Newport, Esq., of Chichester, M.D.,
The Rev. H. Plimley, M.A.,
—— Grant, Esq., M.D., Richmond,
were elected Ordinary Members of the Society; and
M. Emilien De Wael, of Antwerp,
Dr. Hermann Burmeister, of Berlin,
Dr. God. Reich, of Berlin,
Dr. F. Erichson, of Berlin, and
M. Schuppell, of Berlin,
were elected Ordinary Foreign Members.

The President having stated that Mr. Pickering had resigned the office of Curator, a vote of thanks was passed to this gentleman for his exertions during the period whilst he occupied such situation. The sanction of this Meeting was subsequently given to an arrangement whereby the duties of Curator would alternately be performed by Messrs. W. W. Saunders, W. E. Shuckard, and J. O. Westwood.

Exhibitions, Memoirs, &c.

W. Christy, Jun., Esq., exhibited a branch of an oak tree, from Cobham Park, bearing a considerable number of galls, which, instead of being placed on the leaves or stems, were situated on the peduncles of the flowers, giving the tree the appearance of bearing branches of unripe currants, and which were probably caused by the *Cynips quercûs petioli.*

The President stated that he had received a letter from Mr. R. H. Lewis, M.E.S., dated from the Cape of Good Hope, stating the little success he had met with in his entomological researches in the neighbourhood of the Cape, and mentioning that he had noticed some of the species of *Anthia*, which seemed constantly to reside under dung.

Mr. Kirby suggested that it was probably for the purpose of feeding upon the insects which frequent such situations that the *Anthiæ* resorted to such a habitat.

The following Memoirs were read:

"Notice relative to the *Æpus fulvescens* and other submarine Coleopterous Insects." By W. Spence, Esq., F.R.S. (See p. 179.)

"Account of the Habits of the Land Crab of the Deccan, by Lieut.-Colonel W. H. Sykes. With a description of the Species *Thelphusa cunicularis*." By J. O. Westwood, F.L.S., &c. (See p. 181.)

"Descriptions of various Species of *Crustacea* from the island of Mauritius." By Robert Templeton, Esq., R.A. (See p. 185.)

In the discussion which ensued, Col. Sykes, in answer to an enquiry by Mr. Kirby, stated that he had met with the Land Crabs in the Deccan in a very young state and very small size, and that in this state they resembled the full-grown individuals.

With reference to the subject of submarine respiration alluded to by Mr. Spence, Mr. Westwood observed, that the observations of the former appeared to confirm the opinions of certain physiologists, that the distribution of the *Arachnida*, founded upon the variation of the respiratory system, into *Pulmonaria* and *Trachearia* was not entitled to so much weight as others had given to it, and he read a passage from Mr. Jenyns's report on Zoology, not then published, upon the same subject, and also stated the nature of M. Duges' recent observations upon the nature of the respiratory system in the genera of spiders *Segestria* and *Scylodes*, read before the French Institute, which had been found to possess a compound apparatus for respiration both pulmonary and trachean.

The President stated that, in addition to the insects mentioned by Mr. Spence as capable of remaining for a great length of time under the surface of the ocean, the *Hesperophili*, *Heteroceri*, *Limnebii*, and *Epaphius secalis*, as well as other *Bembediidæ*, were similarly submarine in their habits.

The subject of the impregnation of the eggs of insects was again resumed, Mr. Sells suggesting that it was not difficult to account for the operation of the male semen upon the eggs, because they were at first of a soft and porous texture, although they speedily hardened upon exposure to the atmospheric air; he also mentioned a curious fact noticed by the celebrated John Hunter, who found that, by applying male semen taken from the spermatheca of impregnated females to eggs deposited by virgin females, the latter became fertile. The fact, however, that the eggs of some species of moths are ejected from the body with great force, and in rapid succession, of a hard consistence (as in the *Hepialidæ*), was mentioned as being opposed to Mr. Sells's former observations.

Dr. Robert Grant gave an account of the nature of the generative organs of insects, showing, from the researches of Lyonnet, Strauss Durckheim, L. Dufour, and others, that the semen of the male insect is received by the female in a sac or receptacle, over the neck of which the eggs pass in their way from the ovaries to the oviduct.

Mr. Shuckard stated that he had reared a *Plusia gamma* in his breeding-cage, which, without any intercourse with the male, had produced eggs, which had given birth to larvæ, which, however, did not live to attain the imago state.

Mr. Pickering mentioned some circumstances connected with *Halictus*, a genus of bees, which appeared to prove (from the existence of females only in the spring months,) that a single impregnation suffices for two generations, the first of which consists only of females; promising to lay the subject before the Society in a more detailed form when he had obtained further information upon the subject.

Mr. Sells requested information relative to the nature of the digestive organization in those species of moths which are destitute of any organs, in the imago state, for taking nourishment, and proposed the same as an interesting subject for inquiry.

June 22nd, 1835.

Their Royal Highnesses the DUCHESS OF KENT and the PRINCESS VICTORIA having been graciously pleased to declare themselves the Patronesses of the Society, a Deputation, consisting of the Honorary President (the Rev. W. Kirby), the President (the Rev. F. W. Hope), two of the Vice-Presidents (Col. Sykes and Mr. Stephens), the Secretary (J. O. Westwood), and William Ogilby, Esq., waited upon Their Royal Highnesses by appointment this day at Kensington Palace, for the purpose of receiving Their Royal Highnesses' signature declaratory of their royal pleasure; when Their Royal Highnesses were graciously pleased to inscribe their names in the Society's signature-book. At which time the following address was delivered by the President to Their Royal Highnesses:

" In the name of the Entomological Society of London I respectfully beg leave to return our most grateful acknowledgements for the gracious condescension of Your Royal Highnesses in patronizing a new and rising institution. With such a stimulus to exertion, I am not too sanguine in expressing my belief that all the objects of the Society will be fully realized. We hail, as particularly auspicious, the coincidence of the anniversary of the birth of the great Linnæus and that of Her Royal Highness the Princess Victoria; and I assure myself that the same 'generous loyalty to rank and sex' which is the grand characteristic of the œconomy of the hive, will ever be preeminent amongst the members of the Entomological Society."

To which address Their Royal Highnesses were graciously pleased to reply, assuring the Deputation of the interest which they took in the welfare of the Society, and at the same time making their flattering acknowledgements to the Rev. W. Kirby for the 'Introduction to Entomology,' which he had previously had the honour of transmitting to Their Royal Highnesses.

July 6*th*, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Memoir on the Distribution of the Powers of producing Heat and Light among the different Members of the Animal Kingdom. By E. W. Brayley, Esq., F.L.S., the author thereof.

No. 6 of a Manual of Entomology. By Mr. Shuckard.

No. 12 of The Analyst. By the Editor.

The Athenæum, parts 5 and 6, for 1835. By the Editor.

JOHN HILTON, Esq., Demonstrator of Anatomy at Guy's Hospital,
and JOHN ANDERSON, Esq., Richmond,
were elected Ordinary Members of the Society.

The President stated that since the last meeting a Deputation had waited upon Their Royal Highnesses the Duchess of Kent and the Princess Victoria, by Their Royal Highnesses' commands, when they had inscribed their names in the signature-book as Patronesses of the Society.

Memoirs, Exhibitions, &c.

Letters were read from M. Schonherr, For. Honorary Member of the Society, and M. Dreux, the latter giving an account of Brazilian insects which he had to offer for sale.

The Secretary exhibited specimens of the male and female *Cetonia guttata,* received from Sierra Leone, and belonging to the collection of the Natural History Society of Belfast, respecting which species doubts existed in the works of entomological authors both as regarded the sexual diversity and the geographical locality. The male is remarkable for having two straight porrected horns arising from the sides of the head. (Vide Ann. Soc. Ent. France, t. v. pl. 5.)

He also exhibited a bee from the same collection, partaking of the characters of *Anthophora* and *Xylocopa,* and forming the type of a new genus.

The President exhibited a living specimen of a large metallic-coloured species of *Cassida* from Colombia, which had been kept alive in this country by placing moistened leaves in the box. It was stated to feed upon wood. When dead it loses all its brilliancy, and becomes of a dirty yellowish brown colour. The President especially directed the attention of the meeting to this circumstance, which also occurs in several British species, as worthy of investigation in a physiological point of view, as it was affirmed that the colour revives upon plunging the dead specimens into hot water.

The President also exhibited a collection of insects made in the Bara Tonga Islands of the South Pacific Ocean by Mr. Nightingale, and made several observations upon the different species contained therein. Mr. Nightingale, who was present as a visitor at the meeting, stated that the entomology of these islands was of a very limited extent, and that the most formidable species was a *Phasma* (of which species both sexes were contained in the collection), and which is sometimes so abundant in the islands, feeding upon the cocoa-nut trees and devouring both the old stock and the young shoots, that orders are issued by the chiefs to destroy them by cutting them in pieces, thereby to prevent the damage to this tree, which constitutes, in fact, the chief support of the community; from which circumstance, in conjunction with the absence of mammalia in these islands, the President was induced to infer the origin of cannibalism.

The President also exhibited an extensive collection of insects from the Cape of Good Hope, including species of *Apion* and various other genera not previously obtained from that country.

Mr. Children exhibited specimens of pine-apples from the stoves of Sir John Lubbock greatly infested with *Cocci*, and which abounded to such a degree as to become a perfect pest, causing the leaves and fruit of the plant to wither, the insects preying upon the fruit whilst in the young state beneath a white downy secretion. Various remedies were suggested by the members present; but it was admitted that the difficulty in discovering a suitable remedy was greatly increased by the circumstance of the generation of these insects being, from the warmth of the hothouses, continuous, and not annual nor subject to the change of the seasons, as in the outdoor species of the genus. (See p. 206.)

Mr. Sells recommended the application of an infusion of quassia and tobacco-water; but Mr. Children mentioned that M. Bouché had expressly stated that the *Coccus Bromeliæ* was not affected by the latter. He also mentioned that Dr. Lindley had informed him that the plants would bear the application of warm water to 170° without being injured.

Mr. Ingpen recommended washing the plants with soft-soap water and tobacco-water; whilst the application of oily matters was especially commented upon by other members.

The President recommended that the plants when old should be renewed, and recommended the composition given by Mr. Knapp in the 'Journal of a Naturalist.'

Dr. Horsfield suggested a dilution of turpentine, with sugar and water, a dram of the former with a pint of the latter; or mixed with gum or some other matter, in order to make it soluble in water. Mr. Sells observed, that a general mixture of the various ingredients might perhaps be most efficacious.

The consideration of this subject was deferred, but it was recommended that it should either form the subject for one of the prize-essays (see announcement of this subject for one of the essays), or that a Committee should be appointed to suggest the most probably efficacious remedies.

The conclusion of Mr. Templeton's memoir upon Mauritian Crustacea was read.

August 3rd, 1835.

James F. Stephens, Esq., Vice-President, in the Chair.

Donations.

The Bridgewater Treatise upon Natural History, 2 vols. By the Rev. W. Kirby, M.A., Honorary President of the Society, the Author thereof.

Memoir upon the Genus *Nycteribia*. By J. O. Westwood, the Author thereof.

No. 75 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

No. 7 and 8 of the Manual of Entomology. By Mr. Shuckard.

The 7th part of the Athenæum for July 1835. By the Editor.

William Scales, Esq., of Stamford Hill,
Robert John Ashton, Esq., Queen's Buildings, Brompton, and
Mrs. Frederick Hope (the lady of the President),
were elected Ordinary Members of the Society, the ballot for the last-named lady being by unanimous consent dispensed with.

Memoirs, Exhibitions, &c.

Mr. Desvignes exhibited a living specimen of *Callidum holosericeum*, which had been reared in a piece of furniture, which had been in his possession at least seven years, having been made in Paris, since which it had been taken to Turkey, and subsequently removed to London. Numerous other specimens appeared to have made their escape at the same time that the one exhibited was captured.

Mr. W. W. Saunders exhibited specimens of the walking-leaf insect, *Phyllium siccifolium*, from India, in different stages of growth, including also the perfect male and female insects, the former of which is distinguished by having long antennæ and short wing-covers, and exhibits on each side of the middle segment of the abdomen an ocellated process, which Mr. G. R. Gray, in his 'Synopsis of the *Phasmidæ*', appears to have regarded as a specific character, one of the species of the genus being named by him *Phyllium bioculatum*.

Mr. Stephens exhibited a specimen of *Elenchus tenuicornis*, K., in fine preservation, captured by himself whilst sweeping thistles and low herbage about three miles from Hertford, during the present summer. He observed that it was very active whilst in the net, and that it moved its pseudelytra with great rapidity. The abdomen, when alive, is long, but shrivels to about half its length in drying, the segments being connected by a fine pale-coloured membrane. This part of the body when alive is twisted about similarly to that of a *Staphylinus*.

Mr. Hearne, of the island of Saint Domingo, who was present as a visitor, exhibited specimens of the *Acarus*, or Tick, which is very injurious to cattle and horses in Hayti, accompanied by the following observations:—This insect is very injurious to cattle in Hayti, particularly to the horse and ass. Its attacks seem principally directed to the ears of the animal, in the orifice of which it breeds and feeds so fatally that it is very common to see one or both ears of the ass lopping over the face, without power in the animal of ever again raising them. This injury is called by the natives 'Clabaud.' How fast the insect breeds may be inferred from the quantity of eggs in the bottle now exhibited, which were deposited by the two inclosed specimens in the space of three days in a cornet of writing-paper. The specimens were taken from under the tail of a horse. The usual and most efficacious mode of getting rid of this tormenting insect is by anointing its haunts with sweet or other oil; but the writer adds, that if any better or other mode quicker in its effects and equally innoxious to the animal could be ascertained, its communication would render a great service to the Haytians.

He likewise exhibited specimens of the Vegetative Wasp of the West Indies, accompanied by the following note from General Inginac, Secretary to His Excellency the President of Hayti:

"La guêpe végétale, servant de semence au limoncelle, arbrisseau chargé d'epines fort dangereuses, se nourrit de la graine, bien plus volumineuse qu'elle, que produit cet arbrisseau. Des graines du limoncelle on obtient la cire végétale qui est très parfumée. Curiosité naturelle digne d'occuper l'attention des naturalistes. Le limoncelle croit en abondance à St. Jague."

Specimens of the vegetable wax mentioned in the note were also exhibited. An extract from the 'Family Library,' No. 51, ('The Natural History of Insects,' vol. ii., p. 296,) was also read, giving a detailed account of the vegetative wasps. The German work, 'Der Naturforscher,' was also upon the table, in the fourth number of which (tab. iv.) the plant is represented with two of the wasps laying upon the ground on their backs and three flying round the tree, with the vegetable matter growing out of the base of the abdomen.

Mr. Hearne also exhibited a specimen of spider-silk, produced from the *Nephila clavipes*, a large West Indian species, the webs of which are very strong, and are supposed by Mr. MacLeay (in his Memoir upon *Mygale* published in the 'Transactions of the Zoological Society') to have been regarded by the early voyagers as those of *Mygale avicularia*, whence has arisen the incorrect notion that the latter are bird-killing species. According to Mr. MacLeay, the web of the *Nephila* is sufficiently strong to hold a small bird if caught in it.

The same gentleman also exhibited a very large species of *Mygale* from the same island.

Mr. Ingpen exhibited twigs of apple and jasmine trees infested with *Cocci*; in the former the young minute *Cocci* were observed scattered over the surface of the twig. Mr. Ingpen stated, with reference to the suggestions made by himself for the destruction of these insects at a previous meeting of the Society, that in the 'Gardener's Magazine' for the present month is contained a mode of treatment of the pine-apple, by a Correspondent, similar in its nature to that suggested by himself, and which consisted in syringing the plants with soap-lees from the washhouse, heated to 110°, every morning for a week, the thermometer registering 120°. This remedy had been found to be completely effectual in a stock of one thousand plants.

The Secretary exhibited specimens of a species of *Odynerus*, reared from larvæ, forwarded to the Society by Mr. Letts, and which he had minutely examined through their different states, thereby discovering, contrary to the suggestion of Mr. Shuckard, that the larvæ of both sexes exhibit the same number of segments, and are similar to each other.

The following memoirs were read:

"Note relative to the Beetles observed in unrolling a Mummy at Belfast." By Robert Patterson, Esq., Pres. Belfast Nat. Hist. Soc., in a letter addressed to the Secretary.

In this communication Mr. Patterson expresses his dissent from the opinion, that the insects exhibited by him at the meeting of the 4th of May last were coeval with the mummy, and took up their abode in it during the process of embalming. In his opinion the larvæ of the flesh-flies would at that time have been the most likely visitants, and not insects which fed upon *dried* animal substances. The appearance of the mummy-case, independent of any reference to the habits of the insects, corroborates this view. The lower part was decayed, and in some places sufficiently so to give admission to insects. It appeared therefore to him not to be unlikely that those insects may abound in the mummy vaults; and when that part of the case which is in contact with the ground has become decayed, the insects gain admission to the interior. In the present instance they appeared to have gained admission near the feet, attacked, in the first instance, one of the feet, and then travelled upwards, underneath the bandages, making the substance of the legs and thighs furnish them with aliment, until gradually they extended their attacks to the body, the chest, and even a portion of the neck.

Mr. Hyndman agreed also entirely with the writer in this view of the matter*.

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* It does not appear possible to explain, by this view of the subject, why the *larvæ* of the *Dermestes* should be found *dead* if thus in the midst of congenial food, nor why the colours of the perfect insects should be so completely faded.—Sec. E.S.

"Observations upon the Habits of various species of British Insects." By J. O. Westwood. (See p. 198.)

"Account of the Dead Sea Apple, and the Insect which causes its formation." By Walter Elliott, Esq., by whom specimens of this production were exhibited.

Mr. Sells stated, that in Jamaica dogs as well as cattle and horses are very subject to the attacks of ticks of large size, and which are occasionally so injurious to the latter as to cause their ears to drop down without the horses having the power of raising them again; indeed, it is a regular custom once a week, whilst the horses are out at grass, for them to be driven home to be "ticked," the parts infested being rubbed over with lamp-oil, no other remedy having been discovered.

Mr. Shuckard, in reference to some of the observations in Mr. Westwood's paper, stated that he had repeatedly seen *Fœnus Jaculator* in Battersea-fields entering the holes in wood formed by *Stelis phæoptera* and *Megachile centuncularis*, and had also several times captured *Trypoxylon figulus* with its prey, consisting of spiders, whence it was evident that the account given by Linnæus, and questioned by M. Saint Fargeau, is correct; and as this insect is totally destitute of spines on the legs, he is induced to believe that *Sapyga* also is not parasitic, as has been likewise supposed.

September 7th, 1835.

J. G. Children, Esq., Sec. R.S., Vice-President, in the Chair.

Donations.

Mémoires de la Société d'Histoire Naturelle de Genève, vol. vii., part 1. Presented by that Society.

No. 76 of Illustrations of British Entomology. By Mr. Stephens.

Essay on the Geographical Distribution of Man and Animals. By W. Swainson, Esq., F.R.S., &c., the Author thereof.

Remarks on the Natural System. By the same.

The Analyst, No. 13. By the Editor.

The Athenæum, part 8, for 1835. By the Editor.

Nos. 9 and 10 of the Manual of Entomology. By Mr. Shuckard.

A box of Norwegian insects, presented by Mr. C. Hewitson, of Newcastle.

Guérin's Bulletin Zoologique. No. 1 was also on the table, purchased by the Society.

Memoirs, Exhibitions, &c.

"Descriptions of two new Irish *Crustacea*." By Robert Templeton, Esq., R.A.

"Description of a new Hemipterous Insect from the Atlantic Ocean." By the same. (See p. 230.)

A letter from Mr. Engleheart, M.E.S., was also read, announcing the capture of three specimens of *Mancipium Daplidice* at Dover during the month of August last, one of which was taken by Mr. Leplastrier, jun., in the Castle-meadow on the 18th, and the others by Mr. Engleheart on the 20th in an adjoining field. About twenty specimens of *Colias Hyale* were also taken in the same neighbourhood between the 17th and 21st of August, not more than one third of which were of a yellow colour.

October 5th, 1835.

James F. Stephens, Esq., Vice-President, in the Chair.

Donations.

No. 1 of the Fauna Japonica. By M. De Haan (Foreign Hon. M.E.S.) and Dr. Siebold, the Authors thereof.

No. 77 of Illustrations of British Entomology. By Mr. Stephens.

No. 11 and 12 of the Manual of Entomology. By Mr. Shuckard.

Part 9 of the Athenæum for 1835. By the Editor.

Nos. 2 and 3 of the Bullétin Zoologique were also on the table, purchased by the Society.

Walter Elliott, Esq., of the Madras Civil Service, and

John Hearne, Esq., of Port-au-Prince, Hayti, and York-street, Portman-square,

were elected Ordinary Members of the Society; and

M. le Comte De Jean, of Paris, and

M. le Docteur Boisduval, of Paris,

were elected Ordinary Foreign Members.

Memoirs, Exhibitions, &c.

A letter was received from M. Drege of Hamburgh, containing a list of insects for sale from South Africa.

Mr. Ingpen communicated a portion of a pine-apple plant greatly infested by a very minute species of *Coccus*, with which the plant was in some cases completely covered.

Mr. S. Hanson communicated an extract from a letter from Mr. E. Doubleday, containing an account of the destruction of a hive of bees by the *Galleria cereana*, the inhabitants having forsaken the hive, and the comb being filled with the larvæ of the *Galleria*. A portion of the comb completely destroyed, and filled with the cocoons of the moth, was likewise presented to the Society by Mr. Doubleday, by whom also a box of specimens of the moth was laid upon the table for the collection of the Society and for distribution amongst the Members. (Vide Entomol. Mag., vol. iii. p. 414.)

Mr. Sells informed the Meeting that a honeycomb had been shown to him at Kingston infested with two different-sized insects, the larger cocoons of which produced *Galleria cereana* and the smaller *Galleria alvearia*.

Mr. Stephens stated, that the former moth was very rare in collections; the only time that he had heard of its having been found was about forty years ago, when several hives in the neighbourhood of Birch Wood were infested.

Mr. J. C. Johnstone exhibited two living cane-plants infested with the cane-fly, and called the attention of the Society to the rapid and alarming progress made by this insect in extending its ravages at least over two thirds of the island of Grenada. He mentioned that in some plantations, which formerly made as much as 300 hogsheads of sugar per annum, not more than 80 or 90 could now be made. The fly moreover had made its appearance in the neighbouring island of Carriacoo. He begged leave to return the thanks of the Agricultural Society of Grenada to the Society for the report which had been sent out.

The Secretary exhibited a box of Exotic insects, (chiefly *Hymenoptera*,) including many new and rare species belonging to the genera *Paussus*, *Xyela*, *Planiceps*, *Eucharis*, *Apterogyna*, *Psammotherma*, *Celonites*, *Palmon*, &c.

Mr. Shuckard exhibited a small collection of insects from the Cape of Good Hope, including a new species of *Paussus*, *Pentaplatarthrus Paussoides*, &c.

Mr. S. Hanson and Mr. W. W. Saunders also exhibited various new species of exotic insects of different orders.

The Secretary gave a short verbal notice of the following entomological works recently published on the Continent:

M. Wesmael, Monographie des Braconides de Belge.

Dr. H. Burmeister's Zoologescher Hand Atlas.

Dr. Thon's Die Insekten.

He also exhibited various proof plates of insects from several Continental works not yet published, and read the following notice of the entomological proceedings at the Gesellschaft deutscher Naturforscher und Aertze, or meeting of German Naturalists, held at Bonn from the 18th to the 26th of September, 1835.

The proximity of Bonn to those portions of the Rhine scenery which are renowned for their grandeur and beauty induced a large concourse of naturalists and others to attend this meeting. Not fewer than four hundred members of the Association dined together on the first day of the meeting, and their numbers received daily additions. Of the celebrated men present, Berzelius, Carus, Treviranus, Goldfuss, Brongniart, father and son, Audouin, Dumortier, Bonsdorff, Soemmerring, the Prince Von Wied, Jussieu, were amongst the most distinguished, whilst Buckland, Lyell, Greenough, and Horner, were the most celebrated amongst the many English who were present.

The Natural History Museum of Bonn is, in proportion to the size of the University, of very considerable extent, and is kept in the Palace of Popplesdorff, a fine quadrangular building with a centre court, about a quarter of a mile from the town. The lower part of the building is prepared for the reception of the Museum and the upper part is devoted to the residences of the Professors; and from the windows of their apartments, looking over the Botanical Garden, the eye glancing past the Castle of Godesberg rests upon the distant Siebenberg, or Seven Mountains, of which the Drachenfels is the most renowned.

This museum being under the direction of the celebrated geologist Dr. Goldfuss, it is not surprising that the geological portion of the collection should be of the greatest value: the number of fossil remains and the beauty of the specimens is particularly striking.

In entomology the museum contains two collections, one of considerable extent arranged in glass cases upon show tables, and exposed to view (being guarded from the light only by sheets of pasteboard fitted to the glass), and the other, of smaller extent, being the collection of Dr. Nees Von Esenbeck, which was purchased by the University when that professor quitted Bonn. In this collection therefore, which is accompanied by an elaborately drawn up manuscript catalogue, are contained the insects described in Dr. Esenbeck's recently published work upon the minute families of *Hymenoptera*. It also contains a new species of *Diopsis*; a figure and description of which have been given in an additional memoir upon this genus since read before the Linnæan Society by Mr. Westwood.

It was in some of the splendid apartments of this palace that the Geological, Botanical, and Zoological Sections held their sittings. The apartment of the Zoological Section was quite adapted for the occasion, being elaborately adorned with models and carvings of animals in shellwork, with which material the walls and roof were most beautifully ornamented.

The business of the Zoological Section, of which Dr. Froriep was the chairman, and Dr. Goldfuss secretary, was opened by a communication from the President of the Entomological Society of France, presented by M. Audouin, relative to the views of that Society.

A memoir was read by Dr. Hammerschmidt of Vienna, relative to *Spermatozoa* observed in insects.

Dr. Berendt, of Dantzig, communicated some observations upon insects found in amber, accompanied by figures of a species of *Cermatia* found therein: this memoir led to a considerable discussion, in which the president and secretary, and Messrs. Audouin, Van Heyden, and others, took part.

Mr. Westwood presented his address upon the recent progress and present state of Entomology, and exhibited a small and interesting collection of exotic insects.

At this and subsequent meetings of this section, M. Audouin made the following communications and exhibitions:

Observations upon the genus *Serolis* of Fabricius, of which M. Audouin has ascertained the existence of two distinct species, from the sea near Chili; they differ considerably from each other, as appeared by the illustrations of the species exhibited by M. Audouin, as well as from the genus *Brongniartia* of Eights, established upon a Patagonian species, which also belongs to the same group, and which is especially interesting as being apparently analogous to the extinct tribe of *Trilobites*.

Memoir upon an East Indian species of ants, *Formica Smaragdina*, the sexes of which are very different in their colours, the male being brown: the nest is very interesting, being formed of a very thin silk-like tissue, which is found to be doubled.

He exhibited a beautiful cocoon of some unknown Lepidopterous insect from China, which is composed of wide open network, very regularly arranged, with square spaces, leaving the interior visible, and somewhat similar to the cocoons of some of the *Hyperæ*. Also a leaf of a shrub from Madagascar (*Eugenia* —— ?) having a series of large oval eggs placed obliquely side by side along one edge of the leaf, between the epidermis and the body of the leaf. Also the singular crustaceous genus *Prosopistoma* of Latreille, from Madagascar, which exactly resembles a *Gyrinus*. Also specimens of minute larvæ resembling those obtained from the eggs of *Meloe*, hatched from eggs deposited by *Sitaris humeralis*. Also a small collection of singular exotic insects, from the collection at the Jardin des Plantes, including *Chiasognathus Grantii* ♂ and ♀; a new genus of *Lucanidæ* allied to the latter; a new genus apparently allied to *Cebrionidæ*, but having some relation with *Parandra* and *Sagra*, *Torneutes* (Reich), *Cocytia Durvillei*, &c.; also specimens of a minute species of spider found in the neighbourhood of Paris, in which the eyes of the male are placed upon a thick peduncle arising from the front of the cephalothorax (*Micryphantes galeatus*, Kock. Panzer, Suppl. 121, f. 23?).

He also exhibited the following insect monstrosities: *Oryctes nasicornis* ♀, in which the anterior femur of the right side was somewhat enlarged, and supported three tibiæ and tarsi of the ordinary size, two of the tibiæ being soldered together longitudinally, but the tarsi being free. *Melolontha vulgaris*, in which the anterior leg on the right side is similarly tripartite, but the different portions less developed. (See Ann. Soc. Ent. France, tom. iii. pl. 1. A.) *Carabus auratus*, in which the right antenna is furcate at the extremity of the fifth joint, the upper portion being 6-jointed and the lower 4-jointed. (See Ann. Soc. Ent. France, *loc. cit.*, fig. 2.) *Cebrio Gigas* ♂, in which the left antenna is very short, with serrated triangular joints, and the posterior tarsus on the left side very thick.

He also exhibited several species of *Dermestidæ*, and pointed out the existence of ocelli in these insects. He also exhibited an extensive series of drawings intended to illustrate monographs of the genera *Scorpio*, *Gastracanthus* (Fam. *Epeiridæ*), and new *Crustacea*, from the Voyage of D'Orbigny, and likewise a manuscript of Cuvier, published in Silbermann's 'Revue Entomologique.'

The Senator Van Heyden, of Franckfort, exhibited specimens of the following insect monstrosities, namely; *Prionus coriareus* ♀, having three legs arising on the right side, at the extremity of the metasternum: of these legs one was of the ordinary size, and corresponded with that on the left side; the other two were of unequal and smaller size, and apparently abortions, but having the different parts distinct. A *Prionus* from Paraguay, having two legs arising at the right side from the extremity of the metasternum, one of which was of the ordinary size, and corresponded with the left hind leg, but the other was very short, having the trochanter and coxa distinct, the femur and tibia apparently soldered together into a straight piece, the tarsi of the ordinary form. *Calathus fuscus* with one of the antennæ trifurcate. *Eumolpus nitidus*, with the anterior tibia on the right side, very broad and triangular, tripartite beyond the middle, with three perfect tarsi. *Carabus emarginatus* ♀ having the left antenna 9-jointed laterally, and emitting two continuous joints at the extremity of the second joint. *Meloe proscarabæus* ♂ with the right posterior femur thickened and supporting three tibiæ and tarsi. *Calathus ciste-*

loides ♂, with the right anterior tibia dilated at the tip, supporting three tarsi, two of which were united together at the basal joint. *Akis punctata*, having the left antenna much shorter than the other, with the two basal joints considerably enlarged, 9-jointed, and laterally emitting two connected joints at the extremity of the second joint. *Oryctes monodon*, having the head greatly swollen. A *Lycus* of Paraguay, having the left antenna short, distorted, 9-jointed, the four basal joints enlarged, and emitting a short 4-jointed branch from the basal joint. He also mentioned that Borckhausen had described a *Phalæna* with five wings, and Tiedemann a *Melolontha* with seven legs in Meckel's Archives.

The Senator Van Heyden also stated that he had discovered three species of *Xenos*, two of which he had obtained from *Polistes gallica*, namely *X. Rossii*, and a new species in which the branches of the antennæ were very unequal in length; and the third, which is much smaller than *X. Rossii*, he had obtained from a species of *Odynerus* (*O. auctus*?). He also stated that M. Van Roser had observed the larva of a species of this genus in the body of *Vespa vulgaris*, and that he had himself observed the dead body of the larva of *X. Rossii* in the abdomen of *Polistes gallica*, the former being filled with minute hexapod insects like *Acari*, but having the abdomen articulated.

M. Van Roser exhibited various new species of insects from the neighbourhood of Stuttgard.

M. Charpentier exhibited a very extensive and splendid collection of drawings of *Libellulidæ*, intended for a complete monograph of the family.

The following memoir was also read at this meeting:

"On the Internal Anatomy of the Larva of *Calosoma Sycophanta*." By Dr. Hermann Burmeister. (See p. 235.)

November 2nd, 1835.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Recherches sur l'Anatomie et les Métamorphoses de différentes Espèces d'Insectes. Par M. Lyonnet. Presented by the Rev. F.W. Hope.

No. 78 of Illustrations of British Entomology. By Mr. Stephens.

Part 10 of the Athenæum for 1835. By the Editor.

Mons. LOUIS IMHOFF, of Bastle;

Mons. GUSTAVE SILBERMANN, of Strasbourg;

Mons. le Senateur VAN HEYDEN, of Frankfort on the Maine; and
Dr. MAXIMILIEN PERTY, Professor of Natural History at Berne;
were elected Foreign Ordinary Members of the Society.

EXHIBITIONS, MEMOIRS, &c.

The Secretary exhibited several nests of different species of insects from the Cape of Good Hope, showing in a remarkable manner the instinctive powers of these creatures. In one, which was about six inches long, and $\frac{3}{8}$ths of an inch in diameter, the surface was defended by twigs, arranged longitudinally, occupying the entire length of the nest. In the other the outer coat was formed of a very beautiful covering of lacework. These nests were considered as formed by the larvæ of Lepidopterous insects.

The Secretary also exhibited several species of the singular Neuropterous genus *Nemoptera*, Latr., from the Cape of Good Hope, allied to *N. africana* of Leach. Their characters being shortly noticed as follows:

Nemoptera africana, Leach.—Alis anticis ad apicem rotundatis, hyalinis, stigmate albo, nubilâ terminali fuscescenti, costâ immaculatâ; posticis ad basin, antennisque pallidis.

Nemoptera costalis, Westw.—Alis anticis ad apicem rotundatis, hyalinis, stigmate nigro nubilâ terminali albâ, costâ maculis parvis fuscis; posticis ad basin fuscescentibus, antennis pallidis.

Nemoptera angulata, Westw.—Alis anticis ad apicem acutis, hyalinis, stigmate nigro, costâ maculis parvis fuscis; posticis ad basin fuscescentibus; antennis elongatis fuscis. (An mas præcedentis?)

The following Memoirs were read:

"Description of a new genus of Longicorn Beetles, named *Torneutes*, from South America." By Dr. Reich, of Berlin.

Extract of a Letter from W. B. Spence, Esq., giving an account of the successful attempts made by himself to exclude flies from apartments at Trieste, upon the plan described by his father in the first Part of the Transactions of the Society. The writer states that as he could not easily procure a net, he contented himself with driving in nails all around the window-frame, and then putting cross threads, about an inch or rather less distant from each other. The consequence of which was, that although the other rooms in the house were almost intolerable, his had not a fly in it, provided he took care to keep the door shut; he kept all the windows closed except the one which had the netting, and which looked into the garden, and when the sun was on it he was visited with abundance of flies on the outside, though none dared to intrude. Their favourite haunt was on the threads outside, and only once or twice did he detect them intruding. This custom was not known there, but several of the inhabitants who saw it immediately adopted it.

"Monograph upon the Lamellicorn genus *Diphucephala* of MacLeay." By G. R. Waterhouse, Esq. (See p. 215.)

"Notice of the Ravages of a Black Caterpillar upon the Turnips in the South of England." By W. W. Saunders, Esq., F.L.S., &c.

After noticing the occasional appearance of various insects in vast numbers, and the devastation which they produce, the author states, that in no instance had he ever witnessed so great a destruction as was exhibited in the turnip-fields in the neighbourhood of Dover during last August, caused by a small blackish green caterpillar which fed upon the leaves.

These ravages were not confined to particular spots, but were seen in places far apart, very few fields having escaped, although in some the damage was less than in others, where the whole crop appeared to be destroyed, twenty or thirty caterpillars being found on a single plant, scarcely a vestige of green remaining; the caterpillars then seeking subsistence on the harder parts of the leaves, as the tendril and nerves, which they at first refused. No attempt appeared to have been made to remedy the evil. In a field at the back of the Castle, which was half planted with Swedish turnips, and the other half with the common kind, the former were untouched, but the latter greatly injured, although only separated by a furrow, the plants touching each other. Lime-dust or powdered chalk had been spread over the attacked half of the field, and apparently with beneficial results, but few caterpillars remaining.

The botanical distinctions between the Swedes (*Brassica campestris*, var.) and the common turnip (*Brassica Rapa*) were then detailed, and it was observed, that the fact of their not touching the former shows the nice distinction which larvæ sometimes make in their food, and which must be of considerable importance in an agricultural point of view. The caterpillars were rather more than half an inch long, and about as thick as a small crow-quill; they were of a blackish green, with a pale lateral stripe, and pale underneath. The remarkable dryness of the preceding summer was also noticed as worthy of consideration, in connexion with the extraordinary apparition of these insects, and as being probably very favourable to their growth.

Extract of a Letter from W. Mills, Esq., to the President, relative to the habits of the Corn Weevil. (See p. 241.)

"Descriptions of several new Exotic Hemipterous Insects." By J. O. Westwood.

Respecting Mr. W. B. Spence's communication, Mr. Westwood observed that he had noticed flies passing and repassing without fear through a wire grating in front of an open window near Berlin, the meshes of the grating being about two inches apart; there were, however, other windows in the building which were opened.

Mr. Stephens stated that the black caterpillar alluded to by Mr. Saunders was that of an *Athalia* (a genus of *Tenthredinidæ*), (*Ath. centifoliæ?*), which had abounded to a great extent in the south-east part of England this summer, destroying the turnips in the manner described by Mr. Saunders.

Mr. Yarrell mentioned that his attention had been directed to this subject by several members of the Zoological Society, and that he had at their request drawn up a memoir upon this insect, intended for publication in the Transactions of that Society. The insect had been equally abundant and destructive eighteen and twenty-two years ago. The effect of their attacks is almost miraculous, the plants upon four, six, or eight acres being reduced in a couple of days from the full leaf to perfect skeletons. When full grown the larvæ descend to the earth, where they make a hard earthen cocoon, and soon afterwards appear in the winged state. The second crops have, however, escaped their attacks. So great has been the devastation in Kent that ship-loads of turnips have been imported. The insect appears to prefer dry chalky districts. In the dry summer of 1818 they were equally obnoxious, so that it may be considered that long droughts are most favourable for their production. He considered that the Swedish turnip was not infested by these insects in consequence of containing a greater quantity of oily matter, as well as from the more pungent taste of the leaf, and the stronger taste of the root. The name given to the larva by the farmers is the "blacks," and it was noticed, that unlike the attacks of the *Halticæ*, which the quick growth of the plant rendered of short duration, the blacks continued their attacks so long as any leaf was left.

The President stated, that besides the *blacks* and the *Halticæ*, his attention had been directed to two other species of insects, which had proved very injurious to the turnips in Shropshire, Herefordshire, and Worcestershire. These were the larvæ of one of the *Noctuidæ* (*Agrotis*——?), which in the daytime hides itself in the ground, coming forth at night to feed upon the leaves; and the wireworm or larva of some of the *Elateridæ*, which eat into the heart of the turnip. He suggested that the application of quicklime over the turnips after rain at dusk would have the effect of destroying the larvæ when they came forth to feed; and likewise that it would be serviceable to turn poultry and ducks into the fields when ploughed.

Respecting the habits of the *Calandra*, and the situation in which the eggs are deposited, it was observed by the Secretary, that the circumstance that the *Calandræ* are never found in corn-fields, but always about granaries, is sufficient to show that it is not whilst the wheat is in flower that the eggs are deposited, as suggested by Mr. Mills. He also read an account of some experiments lately made by M. Keferstein, relative to this insect, inserted in Silbermann's 'Revue Entomologique,' in which it was likewise stated that the eggs are deposited at one end of the grain.

Mr. Sells stated that the Rice Weevil (*Calandra Oryzæ*) was exceedingly abundant in the stores in the West Indies, destroying great quantities of Indian corn and rice, and that to prevent its attacks it was necessary and customary to expose the grain to the sun, and to winnow it frequently.

December 7th, 1835.

The Rev. F. W. Hope, President, in the Chair.

Donations.

A Manual of British Vertebrated Animals. By the Rev. Leonard Jenyns, F.L.S., &c., the Author thereof.

Parts I. and II. of the Annales de la Société Entomologique de France for 1835. By that Society.

The Journal of the Royal Geographical Society of London, Vol. V. Part II. By that Society.

No. 79 of Illustrations of British Entomology. By Mr. Stephens.

Nos. 15 and 16 of a Manual of Entomology. By Mr. Shuckard.

Part 11 of the Athenæum for 1835. By the Editor.

100 Species of minute *Lepidoptera*, a variety of European *Coleoptera*, and some specimens of Cocoons and Chrysalides, of various British *Lepidoptera*, formerly belonging to the Old Entomological Society. Presented by Mr. Courtnay.

About 50 Species of minute British *Lepidoptera*. By William Hawkins, Esq.

M. Michael Christian Sommer, of Altona, near Hamburgh, was elected an Ordinary Foreign Member of the Society.

Exhibitions, Memoirs, &c.

Mr. S. Hanson exhibited two Cases of Insects recently received by him from Smyrna.

Mr. Westwood exhibited a monstrosity occurring in a specimen of *Aspilates citraria* (one of the *Geometridæ*), captured by himself at the back of the Isle of Wight, and in which the two wings on the left side are united together, and not larger than the ordinary size of one of the posterior wings.

He also stated, from information received by Mr. Babington, that C. Darwin, Esq., who had been for several years past actively occupied in collecting on the shores of South America, had made a very extensive collection of insects, especially amongst the smaller species, and had obtained, in the island of Chiloe, about a dozen specimens of the *Chiasognathus Grantii.*

The following Memoirs were read:

"Notes made during a Voyage from England to Van Diemen's Land, with a Sketch of the Entomology of the Cape of Good Hope," in a Letter addressed to the Secretary, dated Hobarton in Tasmania, 5th June, 1835. By Mr. R. H. Lewis, M.E.S.

During the voyage the writer was greatly annoyed by the cockroaches, which infested his cabin, flying about at night by hundreds, and running over everything. He, however, states that after midnight they are less active and troublesome, so that he was enabled then to obtain rest. They were of two kinds; the most numerous resemble *B. Americana,* but was probably an Indian species; the other similar to *B. Lapponica*. He then proceeds: "The females carried their bags of eggs attached to them for some time, the suture of the large species being placed above that of *Lapponica,* on one side. The former were in immense profusion, and had communication with every part of the ship, between the timbers or skin. The ravages they committed on everything edible were very extensive; not a biscuit but was more or less polluted by them, and amongst the cargo 300 cases of cheeses, which had holes in them to prevent their sweating, were considerably damaged, some of them being half devoured, and not one without some marks of their residence. This serious loss would I believe fall on the shippers, not being covered by insurance; and it is doubtful whether the shipowners would be liable for it, although it was certainly culpable negligence to send a ship to sea so infested with them: it would probably be a new case in a court of law. As to the means of ridding the ship of them, shipbuilders have an objection to steaming the ship, considering that it ever after remains damp; but sulphur, I think, would be efficacious, and without objection: there are doubtless many other ways, and they would form an interesting and useful memoir. I was fortunate enough to obtain four specimens of *Evania.* While upon the subject of these insect travellers, I may mention that *Musca domestica,* Linn.

and some other *Diptera*, were common in the ship from England here, breeding in the rotten potatos, &c. No wonder, therefore, that this fly is so much diffused; and it will probably be difficult to fix its original country. I can state, from personal observation, that the *Musca domestica* of Canada, the United States, Cape of Good Hope, and Hobart's Town (where they are very numerous), are identically one and the same species with that of England, and from the facility with which it propagates, I think it probable that it is to be found in every part of the world.

" It is about here (in the vicinity of the Line,) that the luminous appearance of the sea attains its maximum, and on a dark night, with a fresh breeze, is extremely beautiful; that it is produced by a variety of causes, some by animals and several species of them, and some by chemical action, I have but little doubt, and with proper conveniences for examination (which I had not) much might be effected. Its only abounding when the sea is agitated, has been thought by some a proof of its entirely chemical origin, but I have observed it, though faintly, in the calmest water. While lying at anchor off Margate, when returning from America, I drew up on my fishing-line a piece of sea-weed, on which a spot of light showed itself by regular pulsations or flashes, but with my common magnifiers I was unable to discover any traces of its origin.

" Of the entomological productions of the Cape of Good Hope I made but few captures. There was not much variety near the town. Grasshoppers were numerous, a large red species in particular; they are perfect salamanders; I never had so much difficulty in killing an insect before: dipping the tin in water as near boiling as I could obtain it was useless, and only made them more lively; thrusting it it into the fire for several minutes was not sufficient, although it considerably injured the specimens; and I gave it up in despair, leaving them to die in their own way. I captured two specimens of *Anthia* of the species with sulcated elytra, on the sides of the Table Mountain, and some of the following genera: *Dromius, Harpalus, Onthophagus, Hister, Melolontha, Pedinus? Lytta? Coccinella, Anthicus, Hydrobius, Dermestes*, &c. Of the *Fossores* I observed several species, and should think they must be an abundant tribe here."

After giving an account of his arrival in Van Diemen's Land (or Tasmania as it is now called), with his impressions upon the country, he proceeds: " Last Wednesday I was at Mr. Frankland's, the surveyor-general; there were several gentlemen present, and we had the pleasure of instituting a Society of Natural History, which, if it exist, I trust will be of essential service to the science: at present it is but in embryo. It is proposed that we should meet once a month, and that a subject for discussion should be fixed upon previously. We meet the first Monday of next July at Mr. Frankland's again; the subject proposed is a very interesting one,—the peculiarities of Australasia, or those points wherein it differs from other countries."

And he concludes with the following notes and lists of captures of insects since his arrival in Van Diemen's Land:

"*Lebiidæ*, several genera, including *Dromius* and *Lebia*. Individuals of the latter genus, when captured, emitted a very pungent odour, resembling muriatic acid, which, applied to the nostrils, produced considerable irritation. *Harpalus*, *Bembidium*, *Hister*, *Onthophagus*, *Melolontha*, and some allied genera. *Passalus*, and its congeners. *Dorcas*, *Lamprias*, *Buprestidæ*, though small, I have an elegant species.

"*Elateridæ*, *Curculionidæ*, several genera.

"*Longicornes*, several genera, particularly *Stenocoridæ*.

"*Luperus?* *Haltica*, *Notoclea*, *Chrysomela* and *Cryptocephalus*, *Coccinella*, *Chilocorus*, *Scymnus*.

"The interesting *Microchætes sphæricus* I captured on a blade of grass in the Government domain on the 6th of April. The last three joints of the antennæ are more bent than in the figure, when alive.

"*Telephorus*, *Œdemera*, *Engis*, *Helops*, and others of this tribe.

"*Philonthus*, and several genera of *Brachelytra*.

"A beautiful Homopterous insect, carrying its wings half erect, and certainly the most nimble of the tribe I have yet seen. It seems to be *Ricania*, Ger.

"Several beautiful and peculiar forms of *Coccus*.

"The Mole Cricket is here a very noisy animal.

"*Fossores*. Of those with apterous females I already possess two genera. I was fortunate enough in both instances to detect the sexes.

"*Mutilla*, *Pompilus*.

"*Sphecodes* and *Halictus* only of the bees.

"Ants of various genera are extremely abundant; you cannot turn over a stone (and plenty of stones there are,) without meeting with some."

"Descriptions of two Species of the Coleopterous family *Paussidæ*." By W. W. Saunders, Esq., F.L.S., &c.

"Descriptions of several new or imperfectly known Species of *Paussidæ*." By J. O. Westwood.

"Notes relative to the Natural History of the Dragon-Fly." By Robert Patterson, Esq., Treas. Nat. Hist. Soc. Belfast.

In this communication the author states that the dragon-flies appear to be attracted by particular colours, the species of *Agrionidæ* having been observed to settle on the blue float of a fishing-line; five or six resting on it at a time; whilst great numbers of *Calepteryx Virgo*, and *Ludoviciana* had been seen flying about some beech trees, and frequently alighting on the smooth light-coloured stems. A friend who observed the latter circumstance, conceiving that it might originate in the attraction caused by the white shining colour of the trunk, laid aside such parts of his dress as were not of a white colour, and several specimens immediately flew to him and alighted on his breast. The two last-named insects are common at Ballymena and Portarlington, being 160 miles apart, and yet neither of the species occurs in the intermediate locality of Belfast.

The author also states, from information given to him by B. J. Clarke, Esq., of Portarlington, the following particulars respecting the mode of oviposition in the *Agrionidæ*. After alighting upon aquatic plants during the coupling, the male flies off, but the female descends the stem or leaf of the plant to a depth of some inches below the surface of the water, and there remains, as is supposed, for the purpose of depositing her eggs. On being disturbed, the female desisted from her work, crawled up to the surface, and after remaining there for a few minutes, again directed her way downwards, in order to complete her task. Mr. G. C. Hyndman had observed in one of the ponds of the botanic garden in Belfast, an analogous fact, with respect to one of the larger *Phryganeæ*.

"On the Predaceous Habits of the Wasp." By George Newport, Esq. (See p. 228.)

"Some account of the Economy of the Hymenopterous genus *Perga*." By Mr. R. H. Lewis. (See p. 232.)

The President stated, with reference to the destruction of the turnips by the "blacks," that in Buckinghamshire they had been equally abundant and destructive, and that a meeting of several of the principal farmers had lately taken place, a report of which meeting he hoped to be able shortly to lay before the Society. He added, that in that county the Swedish turnips had suffered equally with the other kinds.

Mr. Shuckard, in allusion to some circumstances mentioned in the letter of Mr. Lewis, stated that he had been long induced to believe that the species of the genus *Thynnus* were the males of *Myrmecodes*, and that he had recently received a male insect from the same country, and belonging to the same family, which he considered to be the male of *Diamma*, Westw.

Relative to Mr. Patterson's observations, several circumstances were mentioned, showing the attachment of insects to particular colours; the falling of the *Dyticidæ* whilst on the wing upon the panes of garden-frames which strongly reflected the rays of the sun, was also noticed, in support of the power of the visual organs of these insects, and which it was impossible to account for by their sense of smell, the former power, to any distance, having been denied to them by some writers.

Mr. Scales stated, that in the summer of 1834 he had observed for a length of time the repeated attempts made by one of the smaller dragon-flies (*Agrionidæ*) to couple with a tortoiseshell butterfly (*Vanessa Urticæ*), adding, that he was convinced that the object of the former was not in the slightest degree predaceous.

Several instances were alluded to of a somewhat analogous singularity, Mr. Shuckard stating that he had observed individuals belonging to two distinct genera of bees, *Osmia* and *Chelostoma*, coupled; and Mr. Hope mentioned that in the Collection of the Zoological Society a *Donacia* and *Crioceris* were thus preserved coupled together, and that he had himself seen the same occurrence in a *Bupestris* and *Elater*.

The President stated, in allusion to Mr. Lewis's communication, that he had recently captured *Lamprias chlorocephalus* (one of the *Lebiides,*) under the bark of trees, and had observed the emission of a caustic and pungent fluid by it when seized. Likewise, that notwithstanding the asserted want of carrion feeders (*Necrophagi*, &c.) in tropical countries, he was well convinced of their existence in such regions.

He also stated that the application of gas tar, obtained from the gas works, in the interior parts of ships, would probably have the effect of ridding them of the *Blattæ*, that material having been found efficacious in various bakers' shops, &c. in London. The use of the glass beetle-trap was, on the other hand, strongly recommended by Colonel Sykes.

Relative to Mr. Newport's observations, the President also stated that he had often noticed at Netley the wings of white butterflies scattered about on the ground, but had always supposed them to have been destroyed by the bats. He had also found the wings of various Lepidopterous insects, especially *Noctuidæ* and *Mormo Maura*, in the wasps' nests, and supposed that these moths having entered the mouth of the nest, had been destroyed by the wasps.

Mr. Scales mentioned the great numbers of ladybirds (*Coccinellidæ*) at the present time found in swarms in various situations about his house at Stoke Newington, adding that they occasionally made their way into the webs of spiders, which were deterred from attacking them in consequence probably of the disagreeable fluid which they emit.

January 4th, 1836.

The Rev. F. W. Hope, President, in the Chair.

DONATIONS.

Genera et Species *Curculionidum*, Vol. 3, part 1. By C. J. Schonherr, For. Hon. M.E.S., the Author thereof.

No. 80 of Illustrations of British Entomology. By Mr. Stephens.

No. 14 of The Analyst. By the Editor.

A collection of Lepidopterous insects, chiefly from India. By Mr. Hope.

A series of specimens of *Sirex juvencus*. By W. Raddon, Esq.

HENRY GEORGE WELLS, Esq., of Surbiton Lodge, Kingston, was elected an Ordinary Member of the Society.

M. F. G. **PICTET**, Professor of Natural History, of Geneva;

M. **LEON DUFOUR**, of Saint Sever, France;

were elected Ordinary Foreign Members.

The President announced the arrival of the collection of Mr. Kirby at the Society's rooms, and congratulated the Society on the acquisition of a standard cabinet of reference, many of the species being unique. He also stated that, with the view of accomplishing the proposals contained in the circular letter which had been forwarded to the members, a subscription had been entered into.

EXHIBITIONS, MEMOIRS, &c.

M. Hoffman, of Munich, who was present as a visitor, exhibited a series of preparations of the silk-worm, in all its states, together with specimens of the cocoon, showing the different layers of silk of which the latter are composed; and stated the successful results of a proceeding whereby the intermediate and most valuable layer was increased, and which was effected by causing the larva to spin its cocoon in a very confined situation, whereby it is prevented from making a scaffolding to support the cocoon, and which ordinarily causes a considerable loss of the silk.

Mr. Westwood exhibited two species of the Crustaceous genus *Megalopa*, sent to him from Ireland by R. Patterson, Esq., and which are regarded by Mr. J. V. Thompson to be immature crabs in a state intermediate between *Zoeæ* and decapod *Brachyura*. This opinion however was regarded by Mr. Westwood as not sufficiently established.

Mr. Raddon exhibited specimens of the wood of a fir-tree, from Bewdley Forest, Worcestershire, perforated and destroyed by the larvæ of *Sirex Juvencus*. Of this tree twenty feet were so intersected by the burrows that it was fit for nothing but fire-wood, and being placed in an outhouse, the insects came out every morning, five, six, or more each day; the females averaged one in twelve for the first six weeks, but afterwards became more plentiful, and continued to make their appearance until the end of November, females only being produced during the last two or three weeks.

Mr. Raddon also exhibited several biscuits completely destroyed by a small beetle (*Anobium paniceum*), which in the larva state had perforated them in every direction.

Mr. J. C. Johnstone exhibited leaves of the sugar-cane greatly injured by the cane-fly, the effects of whose perforations were visible all over the surface of the leaf.

The following memoirs were read:

"Note relative to the Larva of *Blaps mortisaga*." By Robert Patterson, Esq.

"Account of the capture of a remarkable dark-coloured variety of *Vanessa Urticæ*, having the second and third costal black spots confluent, and the posterior wings black, with very slight indications of the blue lunules." By Mr. John Gee of Coventry.

"Descriptions of two new genera of exotic *Hemiptera*." By J. O. Westwood.

"Notice of the varieties of *Chiasognathus Grantii*, forwarded to Cambridge by C. Darwin, Esq." By C. C. Babington, Esq., M.A., F.L.S., &c.

Of the twelve specimens of this insect sent home by Mr. Darwin, several were scarcely more than half the size of the others, but differed in no other respect, the proportion between the mandibles and body being the same in all. The hook at the apex of the mandibles is not much marked in some of the specimens, only appearing as a uniform curve, by which the tip is brought into a vertical position. This does not depend upon size, some of both the large and small specimens having the hook and others wanting it. The scutellum is thickly and minutely punctured. The *Tetrophthalmus chiloensis* of Lesson is without doubt the same insect as this; that name must therefore fall. The individuals sent home by Mr. Darwin were taken in the island of Chiloe, on the south-west coast of South America.

Mr. Darwin also informed the writer that he had taken in that island many species of small insects belonging to European and English genera.

"A Decade of new exotic *Hymenoptera*." By W. E. Shuckard, Esq.

"A Selection of Entomological Notices." By C. Darwin, Esq.; addressed to Professor Henslow, and communicated by W. Christy, jun., Esq.

"On the Turnip Flea, *Haltica nemorum*, with an account of its preparatory states." By Mr. Henry Le Keux; in a letter addressed to W. Raddon, Esq.

The President, in allusion to the ravages of the turnip flea, stated that he had understood that spreading manure in winter was considered much preferable to laying it immediately before sowing the turnip-seed, the fly in the latter case being much more numerous than when the former plan was adopted.

M. Hoffmann stated that in Germany he had practised the smearing of broken pieces of glazed earthenware with birdlime, and spread them about the fields, when the insects, being attracted by the shining appearance of these bits of earthenware, jumped upon them and were captured.

The President stated, in reference to the notices of irregular coupling, mentioned at a former meeting, that he had been recently informed of a similar occurrence having been observed between *Blaps fatidica* and *Akis reflexa*.

He also stated, in respect to the ravages of the *Sirex juvencus*, that in his father's grounds at Netley, he had observed that this insect attacks those trees which have passed their prime, and that the Weymouth pines are more subject to their attacks than the Scotch firs.

He likewise mentioned, with reference to the observations upon the larva of *Blaps mortisaga*, that he was present when a medical gentleman communicated to Mr. Curtis the larva of a *Dyticus* voided by a grown female who had long been subject to convulsions, and that upon that occasion he had proposed castor oil as a remedy.

Mr. Sells approved of this remedy, and added, that as turpentine was used as a specific against *Tænia*, it might also be serviceably employed in cases similar to those mentioned by Mr. Hope.

Anniversary Meeting, January 25th, 1836.

The Rev. F. W. Hope, President, in the Chair.

In pursuance of the By-laws, the four following gentlemen were removed from the Council:

J. G. Children, Esq.	William Christy, jun., Esq.
W. B. Spence, Esq.	William Longman, Esq.

and the four following gentlemen elected into the Council in their stead:

W. W. Saunders, Esq.	A. Ingpen, Esq.
William Sells, Esq.	Charles M. Curtis, Esq.

And the following gentlemen were elected as Officers for the following year:

President	The Rev. F. W. Hope.
Treasurer	William Yarrell, Esq.
Secretary	J. O. Westwood.
Curators	Messrs. Shuckard and Westwood.

Mr. Yarrell, on behalf of the Auditors who had examined and signed the Treasurer's Accounts, read a favourable Report of the Accounts and Finances of the Society, which was unanimously adopted.

The Rev. F. W. Hope then read an Address upon the state of the Society, its progress and prospects*.

The Secretary read a Minute of Council, dated the 22nd inst., whereby it was resolved to present to Mr. Le Keux a copy of the Transactions of the Society, handsomely bound, in testimony of their approval of his Notes upon the Turnip-fly, and as a mark of their sense of the value of his discovery of the preparatory state of that insect.

The Secretary also read a Minute of Council, dated the 22nd inst., whereby it was resolved that, in pursuance of a recommendation made at the general meeting of the Society, held on the 6th July last, the subject of the Prize Essays for the ensuing year should be the *Coccus* of the Pine Apple, the Prize-Essays to be accompanied by testimonials of the success of the remedies proposed by the respective writers thereof.

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* This Address has been since published for distribution amongst the members by Mr. Hope. Copies of it may be had at the Society's Rooms, including an Abstract of the Treasurer's Accounts.

It was unanimously resolved,

That the thanks of this Society, engrossed on vellum and signed by the Members, should be given to the Rev. William Kirby, M.A., Honorary President of the Society, for the magnificent and unqualified donation made by him to the Society of his entire collection of insects.

In pursuance whereof the following vote of thanks has been prepared for signature by the members of the Society, and for presentation to the Honorary President:

"To the Rev. WILLIAM KIRBY, M.A., F.R.S., Honorary President of the Entomological Society of London, &c., &c.

"REVEREND SIR,

"We, the President, Council, and Members of the Entomological Society of London, desire to return our most grateful thanks for the very liberal donation of your entire collection of Entomology. We are fully sensible of its value, and cannot but express our unfeigned pleasure that the gift is unfettered by any restrictions, evincing, as it does, a firm reliance on the character and stability of the Entomological Society.

"The value of an authentic cabinet gives increased importance to our Institution, and in this gift we have the immediate realization of an object which we could only expect would have resulted from many years' labour. We testify our admiration of a generous act, which is strongly characteristic of your well-known devotion to Science, and at the same time we beg to express our respect and regard for the individual who has raised Entomology in this country to its present dignified station. Instructed, animated, and encouraged by your example and success, tyros from our ranks will follow so bright and steady a light, and tread the path to fame as contributors to the advancement of human knowledge and public utility. Long, very long, may we continue to benefit by your judgment and experience!"

LIST OF MEMBERS.

(*To the* 31*st of December*, 1836.)

Those Persons to whose Names an Asterisk is prefixed are original Members.

Honorary President.

* The Reverend William Kirby, M.A., F.R.S. L.S., &c. &c.

Honorary English Member.

* William Spence, Esq., F.R.S. L.S., &c.

Honorary Foreign Members.

Audouin, M. Victor, Cheval. Leg. Honour, Professor at the Jardin des Plantes, President of the Entomological Society of Paris, &c. Paris.

Gravenhorst, Professor J. L. C., Phil. Doct., &c. Breslaw, Silesia.

Gyllenhal, Major Leonard, Cheval. of the Royal Order of Wasa, Member of the Acad. Sciences of Stockholm and Upsal, &c. Skara, Sweden.

Haan (De), W., Phil. Doct., Member of the Societies of Natural History of Regensbourg, Calvados, Paris, &c., Conservator of the Museum at Leyden.

Hammerschmidt, ——, Doctor of Laws, Member of various Societies of Natural History. Vienna.

Klug, Dr. Frederick, Hon. Memb. Ent. Soc. France, Director of the Museum of Natural History, &c. Berlin.

Lefebvre, M. Alexandre, Corresponding Member of the Museum d'Histoire Naturelle de Paris, of the Imperial Society of Naturalists of Moscow, Secretary of the Entomological Society of France, &c. Paris.

Passerini, Signor **Carlo**, Member of the Entomological Society of France, Director of the Museum of Natural History, &c. Florence.

Schönherr, C. J., Councillor of Commerce, Cheval. of the Order of the Polar Star, Member of the Academies of Natural Sciences of Stockholm, Pisa, Moscow, Berlin, Leipsic, &c. Skara, Sweden.

Weidemann, Dr. **Chr.** R. W., Prof. Zool. Keil.

Ordinary Members.

Anderson, John, Esq., Richmond, Surrey.
Ashton, Robert John, Esq., Queen's-buildings, Brompton.

*Babington, Charles Cardale, Esq., M.A., F.L.S., Fell. Camb. Phil. Soc., &c., St. John's College, Cambridge.
Bagster, J., Paternoster-row.
*Bainbridge, Mr. William, 36, Weymouth-street, New Kent-road.
*Barker, Mr. George, 17, Aldgate High-street, London.
*Barnes, Joseph S., Esq., St. Luke's Hospital, London.
Barnes, William G., Esq., Great Russell-street, Covent Garden.
*Bass, Isaac Gray, Esq., Brighton.
Bassi, The Chevalier Carlo, Memb. Ent. Soc. France, Milan.
*Beavan, Edward, M.D., Ferry Side, near Carmarthen.
Beck, Dr., Conservator of the Royal Museum, Copenhagen.
*Bell, Thomas, Esq., F.R.S. L.S. Z.S. &c., Soc. Hist. Nat. Paris. Corresp., New Broad-street, London. *Vice-President.*
*Bennett, Mr. William, Lark-hall-lane, Clapham.
Berendt, Dr., Copenhagen.
*Bevington, James B., Esq., St. Ann's Hill, Wandsworth.
*Bird, Rev. C. H. Smith, M.A., F.L.S., Burghfield, near Reading.
*Blundell, E. S., M.D., Seymour-street, Portman-square.
Boisduval, M., Paris.
*Bowerbank, J. S., Esq., 19, Critchell-place, New North-road, London.
*Bramall, Thomas, Esq., Tamworth Castle.
*Broadwood, Henry, Esq., Bryanstone-square, London.
*Broome, C. E., Esq., Trinity Hall, Cambridge.
*Browne, Rev. R. G. S., Dulwich College.
Burmeister, Dr. Hermann, Berlin.

Castelmeau, M. le Comte de, Paris.

Chaudoir, M. le Baron Maximilien de, Kiew, Dorpat, Livonia.
Chevrolat, M. August., Memb. Ent. Soc. Paris, &c., Paris.
*Children, J. G., Esq., Sec. R.S. F.R.S.E. &c. &c., British Museum. *President.*
*Christy, William, Jun., Esq., F.L.S., Clapham-road.
*Christy, J. P., Esq., Clapham-road.
*Churton, Henry, Esq., Oxford-street.
Cochran, F., Esq., London.
Cristofori, Signor, Milan.
*Curteis, Mrs. J., Tenterden-house, Kent.
*Curtis, Charles M., Esq., Trevor-square, Brompton.

*Darwin, Charles, Esq., B.A., Corr. Memb. Zool. Soc., Fell. Camb. Phil. Soc., Shrewsbury.
*Davis, Abraham Hopkins, Esq., Memb. Ent. Soc. France, Brunswick-place, Camberwell.
De Jean, M. le Baron, Paris.
*Desvignes, Peter, Esq., Golden-square, St. James's.
*Desvignes, T., Esq., Golden-square, St. James's.
De Wael, M. Emilien, Antwerp.
*Doubleday, Mr. Henry, Epping.
*Downes, H., Commander R.A., F.L.S., Naval and Military Museum, Whitehall.
Dufour, M. Léon, St. Sever, France.
Dupont, M., Paris.

Edwardes, Sir Henry, Bart., Ryton, Salop.
Elliott, Walter, Esq., Princes-street, Cavendish-square.
*Engleheart, N., Esq., Park, Blackheath.
Erichson, Dr. Fred. Will., Berlin.
Esenbeck, Dr. Nees von, Breslau.
*Eveleigh, Joseph, Esq., Manchester.
Ewing, T. J., Mr., Sydney, New South Wales.
*Eyton, Thomas, Esq., Eyton, Salop.

Fahrœus, M. Chev. Polar Star, Governor of Gottenburg, Sweden.
Fischer, Gotthelf, Count de Walldheim, Moscow.
Fleming, J., Rev. Dr., Professor Nat. Phil., Aberdeen.
Fridvalwski, von Fredval M., Pesth, Hungary.
Fræhlich, M., Eilvagen.

*Goodal, Rev. Joseph, D.D., F.A.S., L.S. H.S. &c., Provost of Eton College.

Gory, M. Hippolyte, Memb. Soc. Hist. Nat. Paris, Ent. Soc. France, &c., Paris.

*Gould, John, Esq., F.L.S., Z.S., Broad-street, Golden-square.

Graells, P. M., Barcelona, Spain.

Grant, Robert, Esq., M.D., Prof. Zool., London.

Grant, ——, Esq., Richmond.

*Gray, George Robert, Esq., Memb. Soc. Ent. France, Hampstead-green.

*Griesbach, Rev. Alexander William, B.A., Westow, near Whitwell, Yorkshire.

*Griesbach, Henry, Esq., 49, York-street, Baker-street.

*Griesbach, G. Adolphus, Esq., Vine-house, Old Brompton.

*Griffith, Edward, Esq., F.R.S. A.S. L.S., Featherstone-buildings.

Guérin, M. F. E., Memb. Soc. Hist. Nat., Soc. Ent. France, &c., Paris.

Gutch, J. W. G., Esq., Wind-street, Swansea, Glamorganshire.

*Hanson, Samuel, Esq., Memb. Ent. Soc. France, Botolph-lane, London.

*Harris, The Hon. Charles M., Heron Court, Hants.

*Hawkins, ——, Esq., London-terrace, Hackney-road.

*Heales, G. S., Esq., Doctors' Commons.

Hearne, John, Esq., Port au Prince, Hayti, and Montague-square, London.

Hely, George, Esq., Johnston, Ireland.

*Henessy, P. H., Esq.

Heyden, M. le Senateur Van, Frankfort.

*Hole, Henry, Esq., Ebberley-house, near Great Torrington, Devon.

Holme, Frederick, Esq., M.A., Corpus Christi College, Oxford, and Windham Club, London.

*Hooker, Joseph, Esq., Glasgow.

*Hope, Rev. Frederick William, M.A. F.R.S. L.S. Z.S. & G.S. Memb. Ent. Soc. France, 56, Upper Seymour-street, Portman-square. *Vice-President and Treasurer.*

Hope, Mrs. F., Upper Seymour-street.

Hope, Thomas H., Esq., Netley, Shropshire.

Horner, Edward, Esq., Grove-hill, Camberwell.

*Horsfield, Thomas, M.D., F.R.S. L.S. G.S. Z.S. Royal Asiat. Soc., Imp. Acad. Nat. Curios. Socius, Corr. Memb. Acad. Nat. Sciences Philadelphia, and Hist. Soc. Pennsylvania, &c., East India House.

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Jarman, G., Esq., 21, Upper Berkeley-street.
*Jenyns, Rev. Leonard, M.A., F.L.S., Fell. Camb. Phil. Soc., &c., Swaffham Bulbeck, Newmarket.
*Image, Rev. John, Dulwich College.
Imhoff, M. Louis, Basle, Switzerland.
*Ingpen, Mr. Abel, A.L.S., 29, Upper Manor-street, Chelsea.
*Johnson, Mr. A., Gaol, Nottingham.
Johnstone, J. C., Esq., Grenada.

Knott, William, Esq., Wimborne, Dorsetshire.

*Lees, Edwin, Esq., Worcester.
Lehmann, Dr., Botanic Garden, Hamburgh.
*Leigh, H. T., Esq., Turnham-green.
*Letts, Mr. Thomas, Royal Exchange.
*Lewis, Mr. R. H., Hobart Town, Tasmania.
*Lewis, Mr. W. E., Hobart Town, Tasmania.
Lingwood, R. M., Esq., Christ College, Cambridge.
*Longman, William, Jun., Esq., Hampstead.
*Lucas, Geoffrey, Esq.

MacLeay, William Sharp, Esq., Soho-square.
*Malmesbury, Right Hon. the Earl of, Heron Court, Hants.
Mannerheim, Count C. G. De, Governor of Wiburg, Cheval. Ord. St. Wladimir, Finland.
*Marshall, Thomas, Esq., The Crescent, Birmingham.
*May, Rev. George, Strode-house, Herne.
*Melly, A., Esq., Pall Mall, Manchester.
Menetries, M., St. Petersburgh.
Mills, W., Esq., F.L.S., Willington, Durham.
*Morris, Edmund, Esq., 38, Cambridge-terrace, Edgware-road.

Newport, George, Esq., M.D., Chichester.
*Norris, Thomas, Esq., Ridvales, Bury, Lancashire.

Ocksay von Ockso, M. le Baron, Privy Counc. Emper. Austria, &c.
Ogilvy, William, Esq., F.L.S., Z.S., &c., Gower-st., Bedford-square.

*Paget, C. J., Esq., Great Yarmouth.
Perty, M. Maximilien, Prof. Nat. Hist., Berne.
Petit, Louis Hayes, Esq., F.R.S. A.S. L.S. H.S. &c., Lincoln's Inn.
Pettigrew, Thomas Joseph, Esq., F.R.S., &c., Saville-row.

*Pickering, W. B., Esq., Phillimore-place, Kensington.
Pictet, M., Geneva.
Plimley, Henry, Rev., M.A., Cuckfield, Sussex.
*Preston, Rev. J. D. J., Asham, Bryant, near York.
Prichard, J. O., Esq., Pudding-lane, London.
Power, John Arthur, Esq., M.A., Fell. Camb. Phil. Soc. and Fellow of Clare Hall, Cambridge.

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—— —, — 41, *for* for ὀψ oculus *read* ὄψις facies
—— 50, — 1, *for* spurs *read* spines
—— —, — 27, *for* 3 *b.* *read* 3 *a.*
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—— 52, — 19, *for* Fargau's *read* Fargeau's
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—— 99, — 35, *for* fig. 1. *read* fig. 1—4.
—— 103, — 2, *for* fig. 1. *read* fig. 1—4.
—— —, — 3, *for* 1 *a.* *read* fig. 1.
—— —, — 4, *for* 1 *b.* *read* fig. 3.
—— —, — 5, *for* 1 *c.* *read* fig. 2. *and add*, fig. 4. the neuter, of the natural size
—— —, — 7, *for* fig. 2. *read* fig. 5.
—— 104, — 10, 11, and 12, *for* fig. 2. *read* fig. 5.
—— —, — 14, *for* fig. 3. *read* fig. 6.
—— 106, — 9, *dele* were
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—— 115, — 13, *dele* Mimela sumptuosa? *Zool. Journ.* 5.
—— 147, — 14, *for* Cæsei *read* Cæsar
—— 149, — 7, *for* niger *read* nigra
—— 156, — 18, *for* insect *read* insects
—— 165, — 17, *for* abdomens *read* abdomen
—— 199, — 38, *for* burrows *read* burrow

JOURNAL OF PROCEEDINGS.

—— i, line 7, *for* 1834 *read* 1833
—— xii, — 34, *for* on *read* in
—— xxxix, — 35, *for* Dantzig *read* Frankfort. (The statement here made was incorrect. See Journal of Proceedings, p. lxxiv.)

PROSPECTUS

OF

PRIZE ESSAYS

ON THE

SUBJECT OF NOXIOUS INSECTS AND REMEDIES FOR THEIR DESTRUCTION.

It being one of the principal objects of the Entomological Society of London to render their labours practically useful, the Council have resolved to appropriate the annual sum of Five Guineas, or a Gold Medal of the like value, to the Writer of the best Essay (to be drawn up from personal observation) upon the natural history, œconomy, and proceedings of such species of insects as are obnoxious to agricultural productions, to be illustrated by figures of the insects in their different states; together with the result of actual experiments made for the prevention of their attacks or the destruction of the insects themselves.

The subject of the Essays for the year 1836 to be the Coccus of the Pine Apple.

The Essays must be accompanied by testimonials of the success of the remedies proposed by the Writers, and must be forwarded to the Secretary, (at No. 17, Old Bond Street,) with fictitious signatures, on or before the Fourth Monday in January 1837, when they will be referred to a Committee to decide upon their respective merits, after which, with the permission of the Writers, both the Prize Essay and any others of value will be published.

The Essays must be respectively accompanied by a sealed letter, indorsed with the fictitious signature adopted by each Author, and inclosing the real name of the Writer.

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